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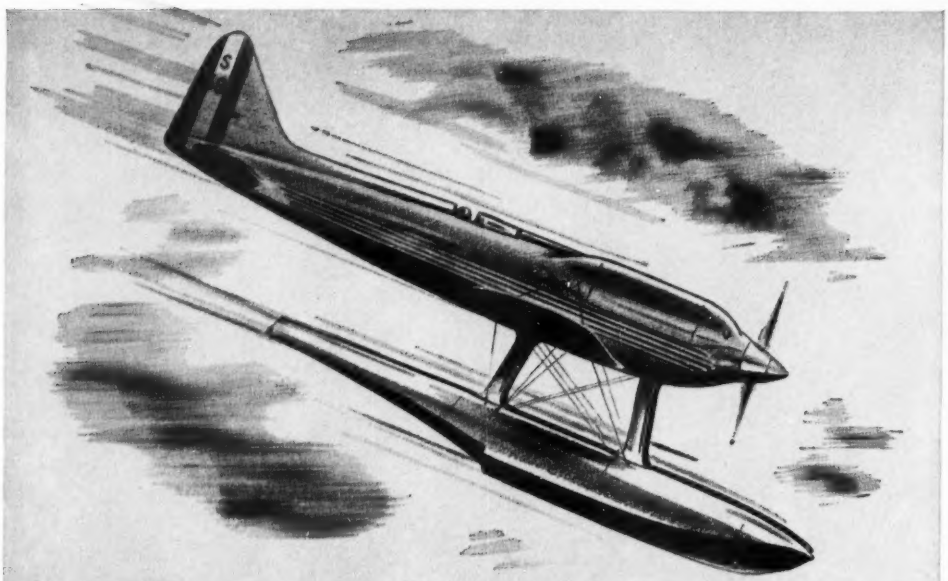

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The Supermarine S6B flown by Flt/Lt. Stainforth levelled off at the stipulated 50 metres height over the water to commence what proved to be a world record speed run. The closest control had to be exercised by the pilot to keep his course straight and level and in this he was assisted by Kelvin Hughes instruments. A new record of 407.5 m.p.h was established—a striking figure for 1931.

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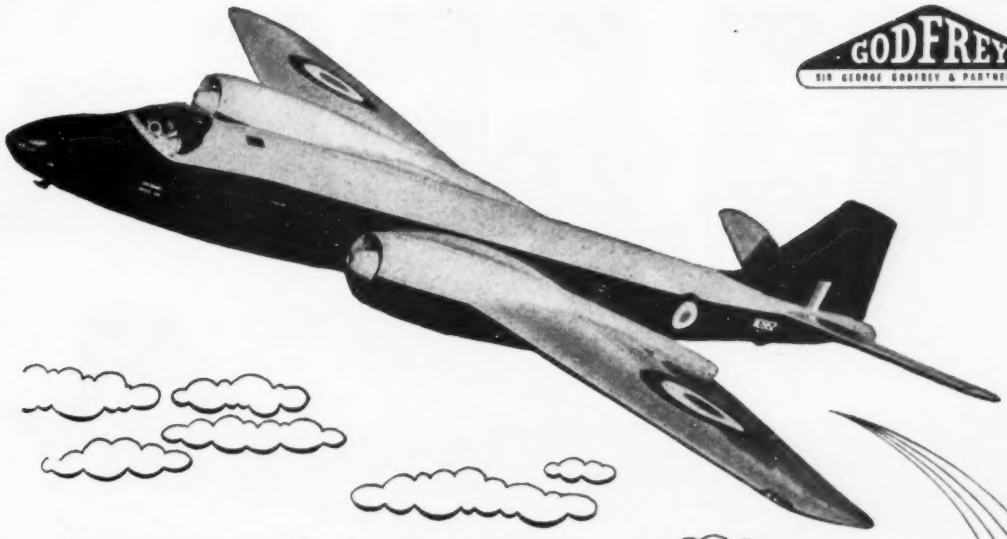

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Congratulations to The Bristol Aeroplane Company and all concerned in the record-breaking flight of the Canberra/Olympus to 63,668 feet. A Godfrey two-stage Cabin Supercharger Type 5/50/25 pressurized the cabin in this aircraft and supplied warm air for heating.

Godfrey cabin superchargers are also giving excellent service in the Airspeed Ambassador, B.O.A.C. Argonaut, Bristol Britannia, Handley Page Hermes, Vickers Viscount and many other aircraft.

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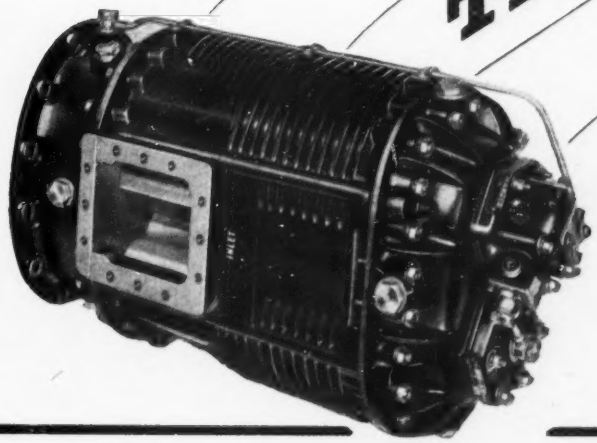

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... a triumphant combined operation

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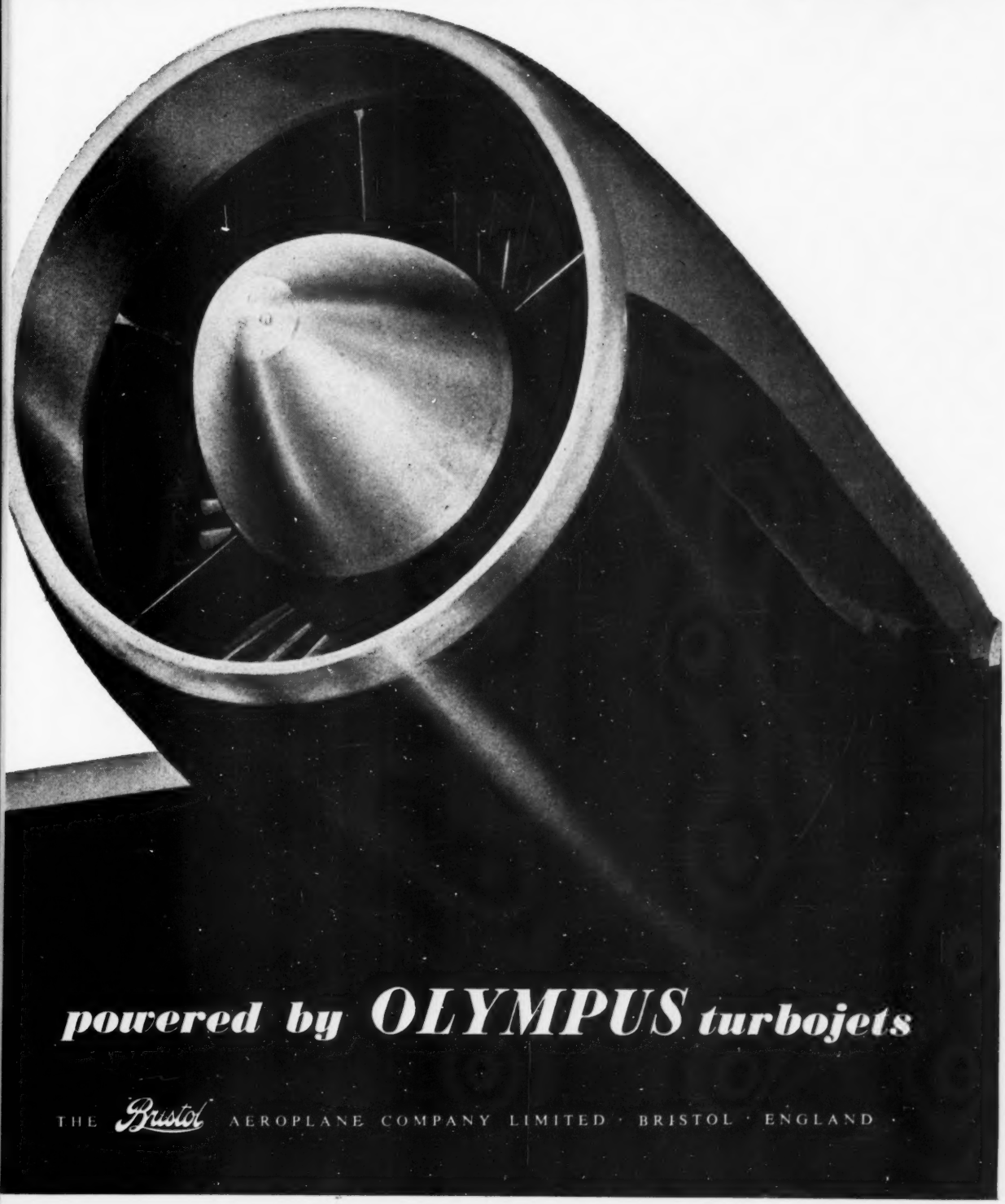
THE ENGLISH ELECTRIC COMPANY LIMITED, QUEENS HOUSE, KINGSWAY, LONDON, W.C.2

altitude record!



powered by **OLYMPUS** *turbojets*

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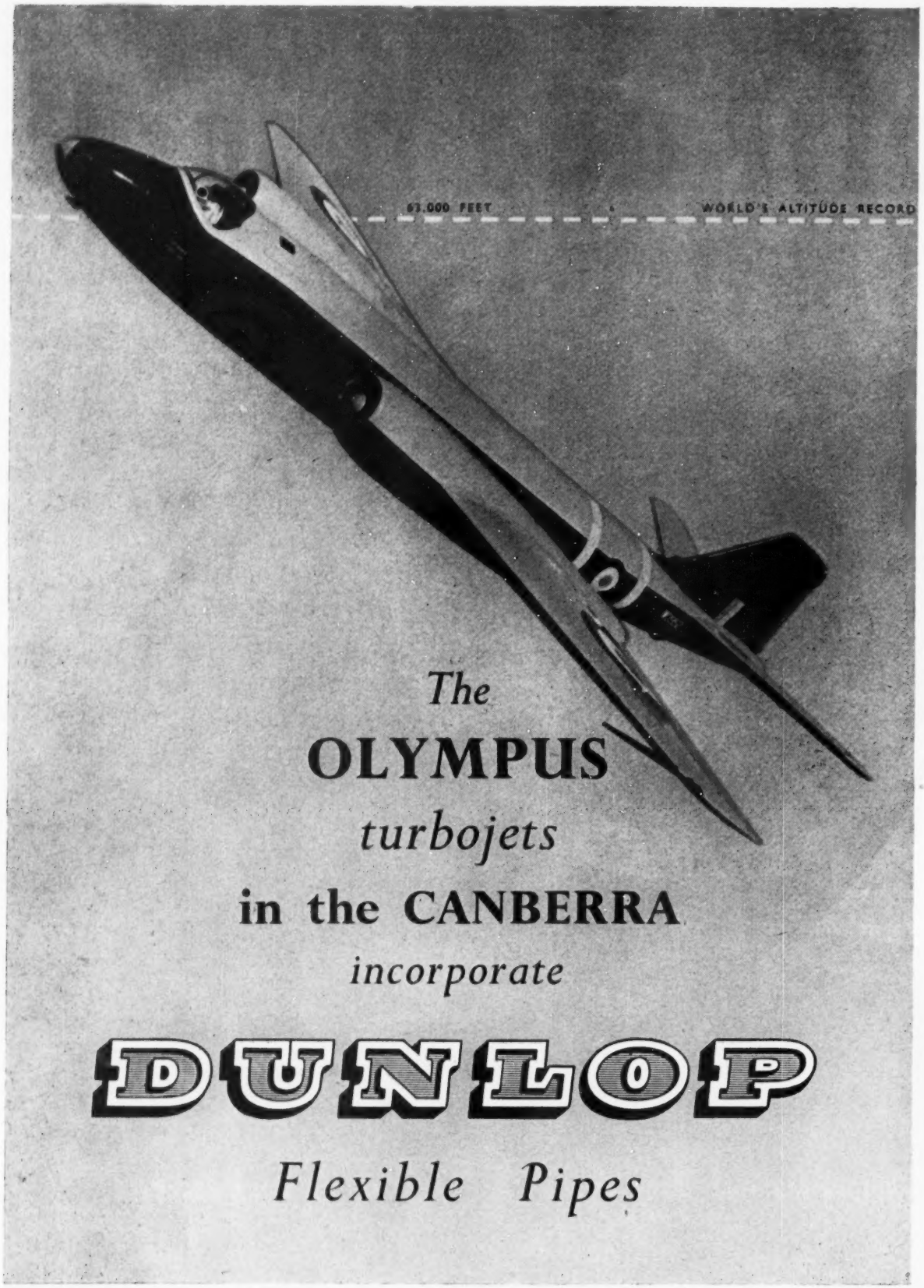

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ALTITUDE RECORD

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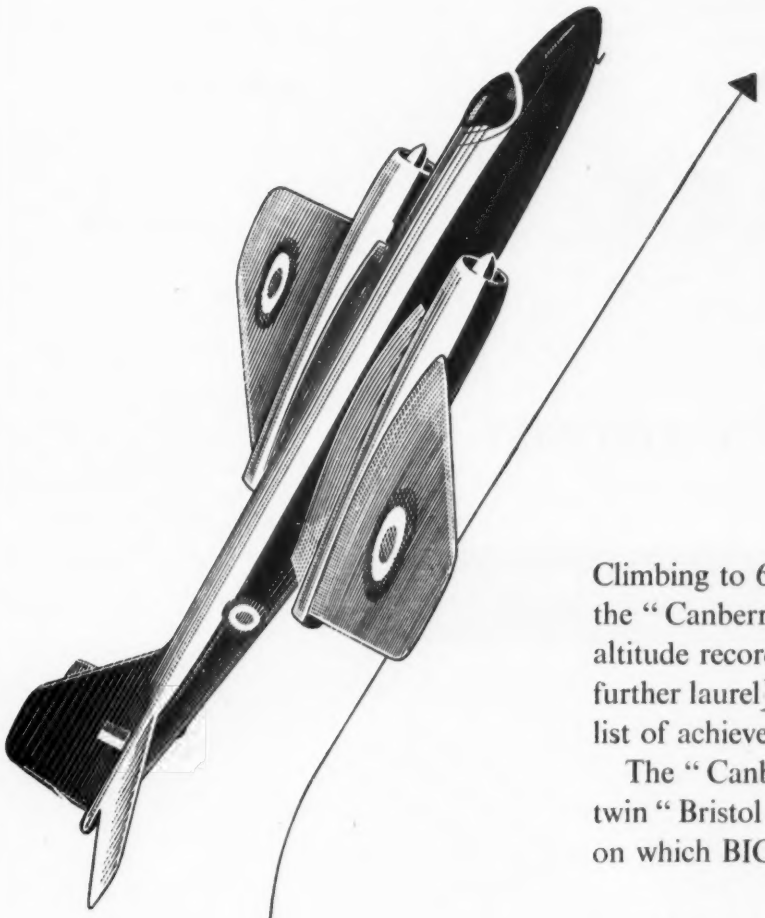

Climbing to 63,668 feet—
the "Canberra" breaks the World's altitude record, and adds a further laurel to its impressive list of achievements.

The "Canberra" is powered by twin "Bristol" OLYMPUS jet engines on which BICC cables are used.

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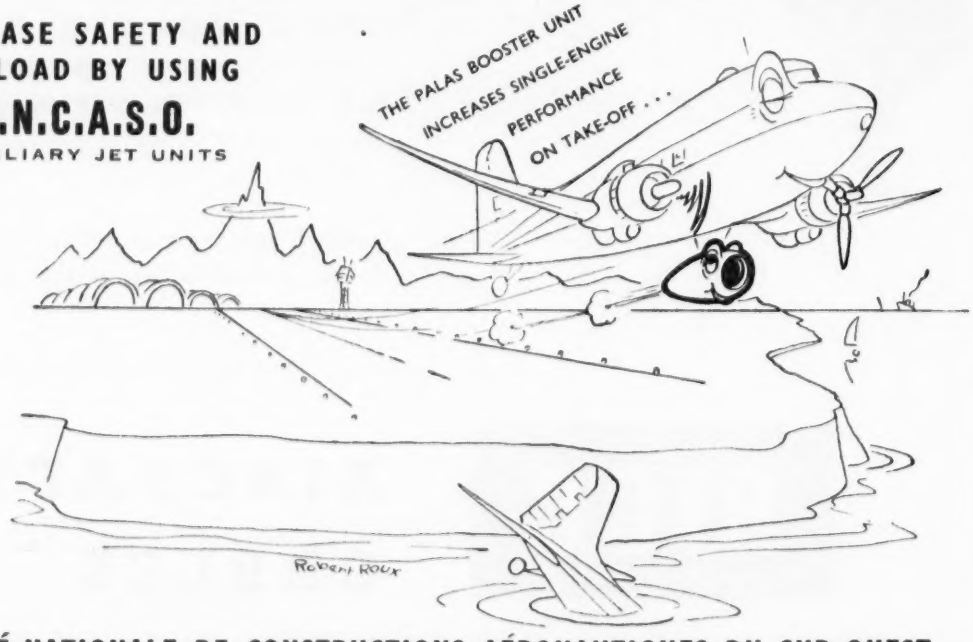

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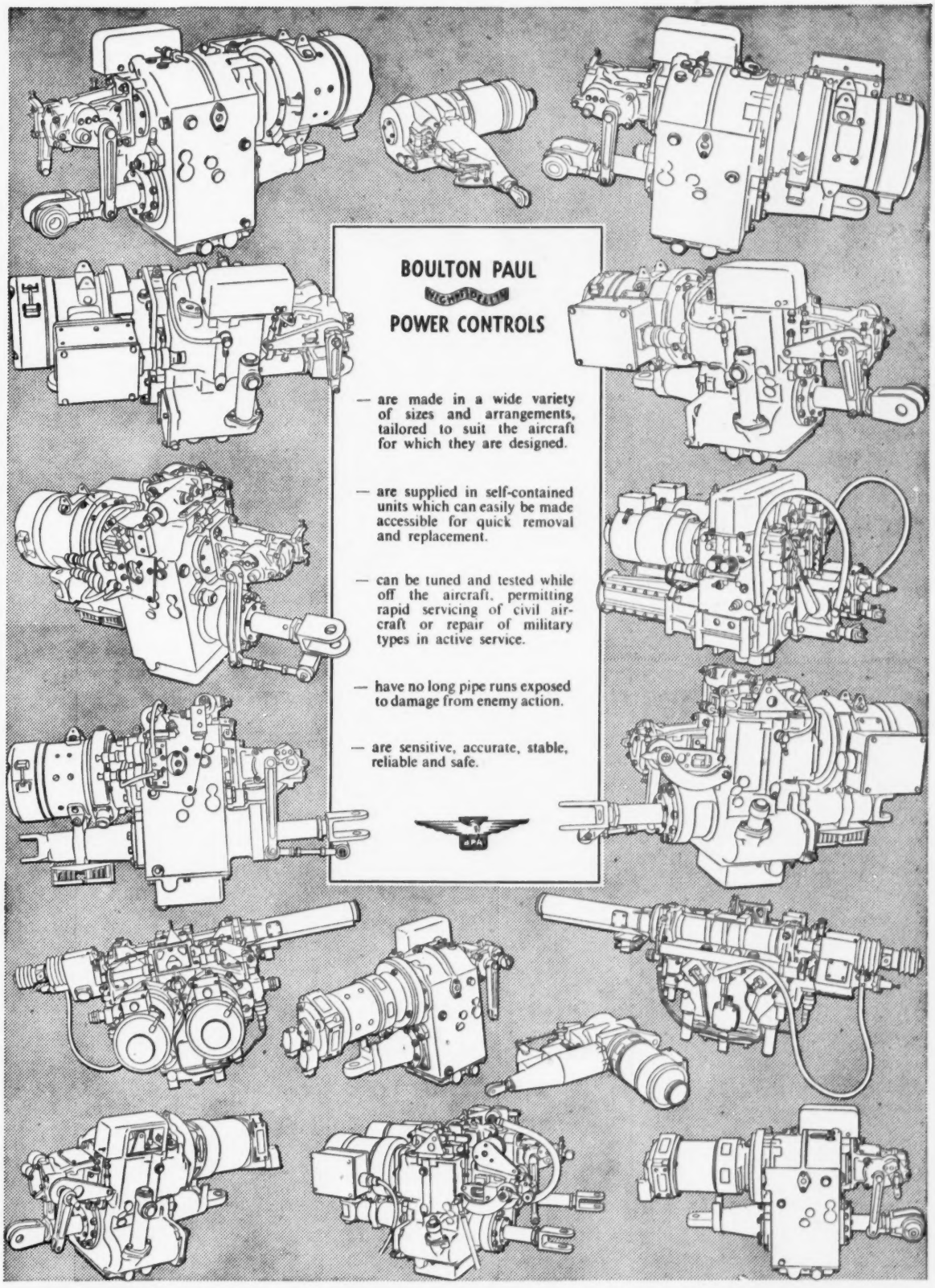
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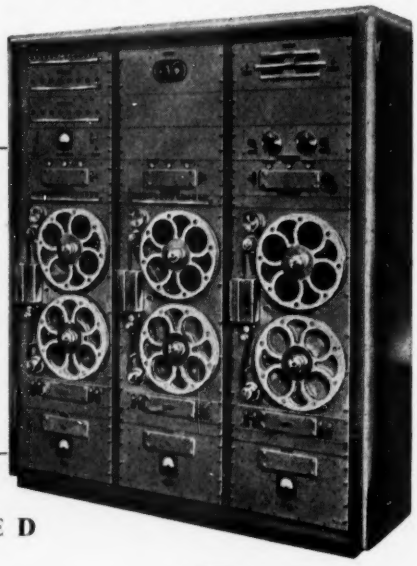

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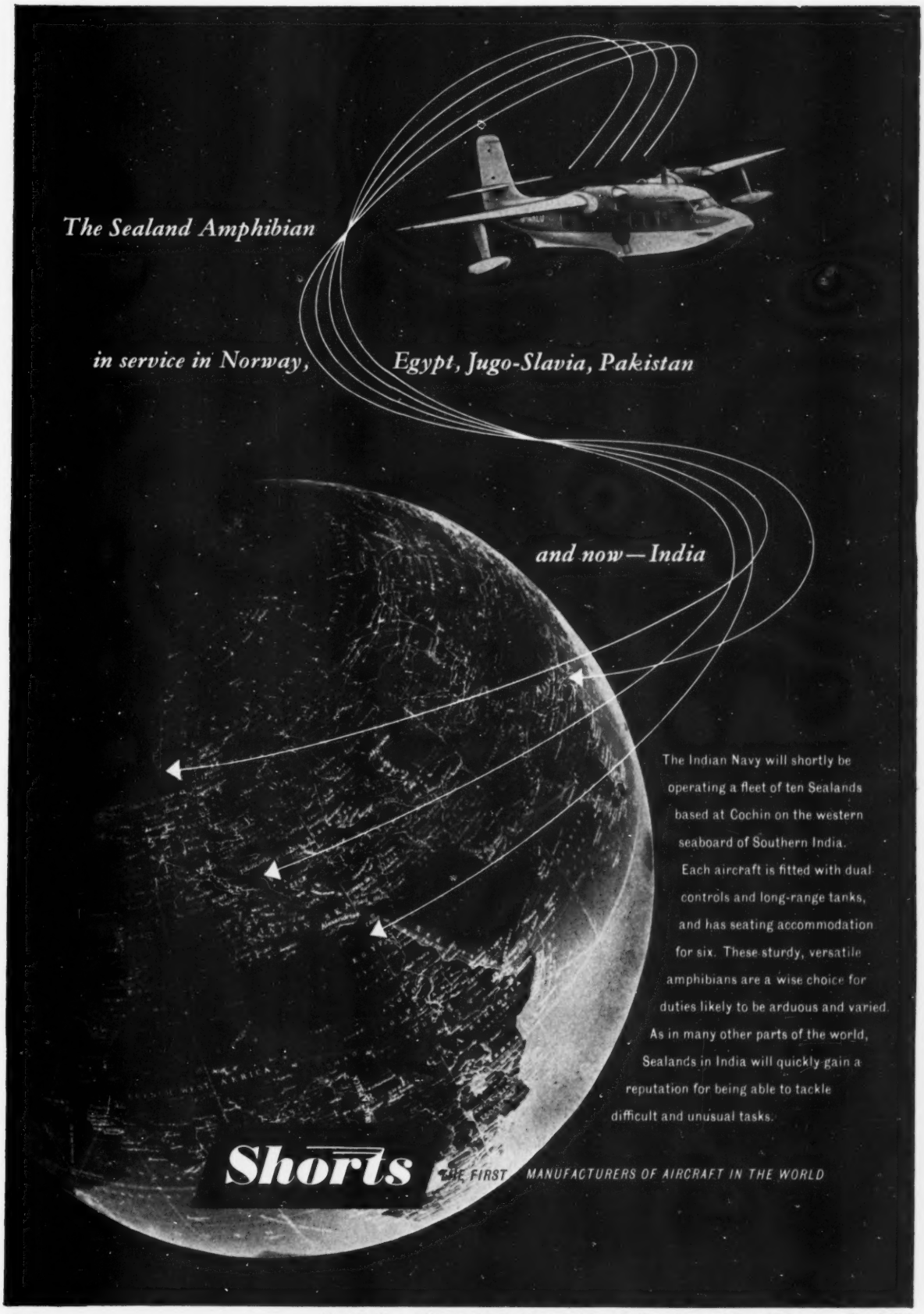
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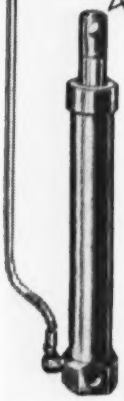

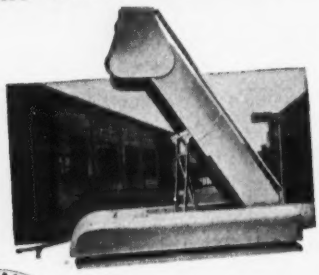

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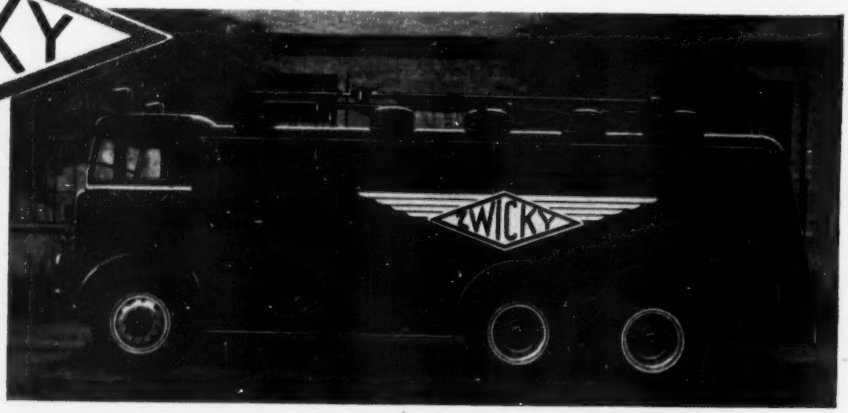

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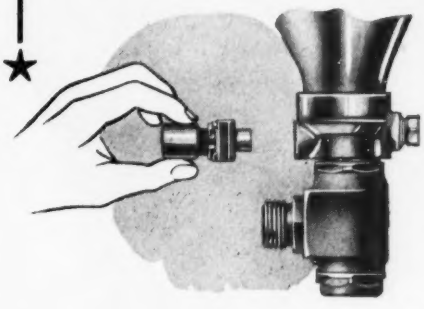

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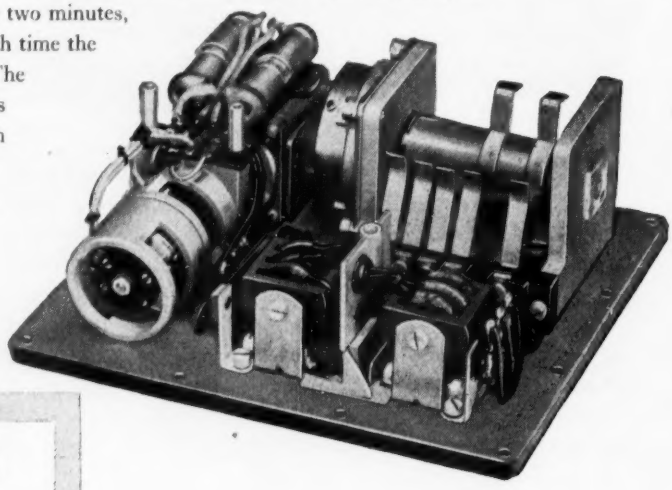

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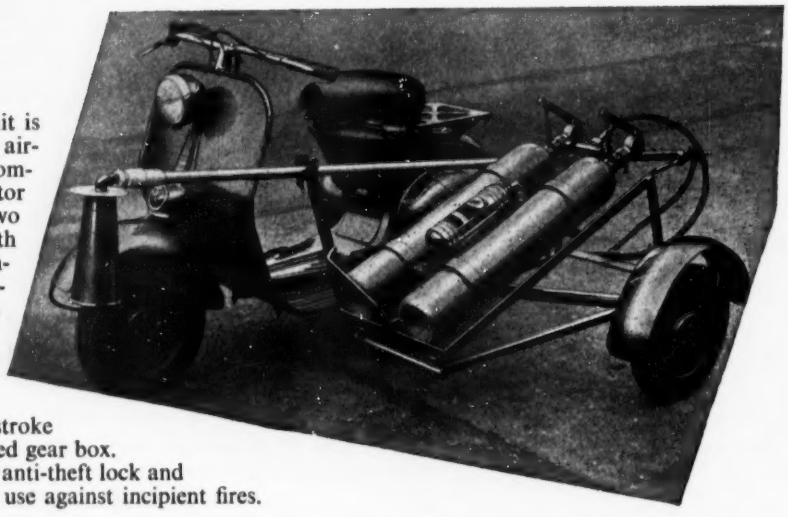

This self-contained Fire Fighting Unit is designed primarily for extinguishing aircraft starting-up fires on airfields. It comprises a "VESPA" Lightweight Motor Cycle Combination equipped with two 12-lb. cylinders of carbon dioxide with gas release valves, manifold, high-pressure hose and self-extending telescopic CO_2 applicator, which enables the gas discharge to be concentrated into the engine nacelles. This mobile fire fighting unit has a cruising speed of 30 m.p.h. and petrol consumption of 65 m.p.g. It is powered by a two-stroke engine of 125 c.c. and has a three-speed gear box. Supplied with lighting, horn, tool kit, anti-theft lock and a "PYRENE" Fire Extinguisher for use against incipient fires.

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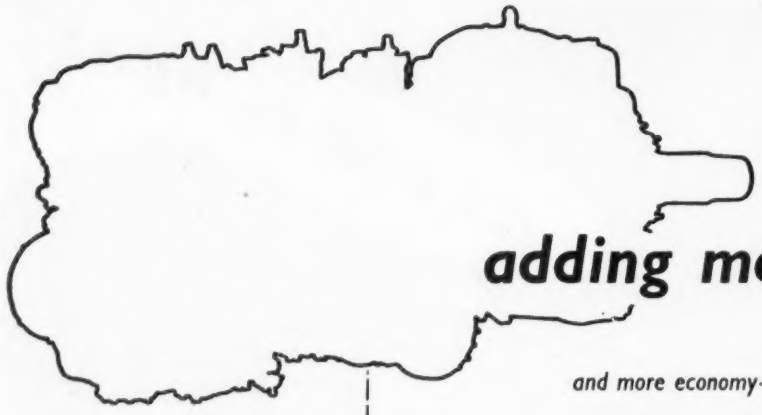

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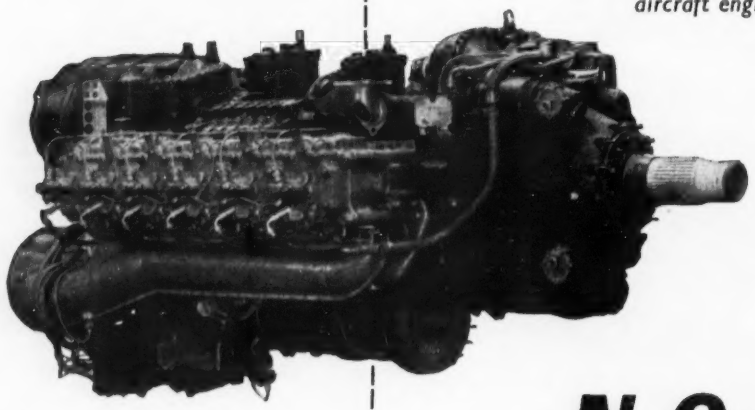

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Founded 1909

No. 2313 Vol. LXIII. FRIDAY, 22 MAY 1953

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Another Little Drink

ANYONE whose interests, professional or otherwise, lie in aviation, would do well to think for a moment how much (or how little) he knows about refuelling in flight and, if there are gaps in his general knowledge of the subject, to make a note to bring this knowledge up to date.

By reason of the name itself, almost everyone is familiar with the principles and aims of Flight Refuelling. Most will also know of the British company of that name which, under the chairmanship of Sir Alan Cobham, pioneer aviator and pioneer in this field also, has done so much to exploit and develop the process. Rather than stress our own advocacy of flight refuelling, we would mention a few aspects of the subject for consideration or reconsideration. On page 630 of this issue reference is made to some developments until recently withheld for security reasons, while *Flight* of October 31st, 1952, contained one of several articles in which the subject has been discussed in detail.

Although flight refuelling is a British idea and a great deal of the initial development work has been done in this country, starting as long ago as 1932, much of the most important recent experience and improvement has been obtained under American contract. The latest methods have been proved on Atlantic flights and, operationally, over Korea, and the probe-and-drogue system is being widely adopted in America. Much less appears to be happening in this country.

A virtually watertight case can be made for the adoption of flight refuelling, both for military and civil aircraft, but it is not easy to give convincing practical demonstrations for the benefit of those who, taking the technical considerations as read, think only in terms of £ s d. Initially, in the provision of equipment and tankers—which in most instances would be extra aircraft—the scheme appears costly and elaborate. It cannot be placed under the heading of essential, and so plans for its adoption progress little beyond the theoretical and experimental stages. There is a distinct risk that the financial and operational advantages will first have to be demonstrated by some foreign organization before they are properly recognized and appreciated in the country of origin.

It is the thirst of jet aircraft which has put a new edge on American interest. As a result, the first three-point tanker for simultaneous refuelling of three fighters, at a flow rate (at that time) of some 200 gallons per minute each is a modified American B-29—now many months old. Two of its three refuelling units are carried in streamlined pods at the wing-tips as shown in the newly released illustration on page 630.

For military usage the majority of large aircraft should be equipped at the design stage to serve in both receiving and supplying rôles. Much of the built-in aircraft equipment required is already obligatory for normal pressure refuelling on the ground, and very little extra weight or cost would be involved in making provision for the probe and detachable hose-drogue pack. The same remarks apply to an airliner's equipment to receive fuel in flight. Some quite startling figures can be produced, indicative of the advantages to be gained from flight refuelling of jet aircraft, in range, payload or a combination of the two. The considerable saving in time between departure and arrival at destination if one or more refuelling stops can be avoided should not be overlooked. From the military point of view, it is claimed that 100 fighters could do the work of 200 by saving the time lost in landing to refuel.

A state of simplicity and dependability of equipment has been reached which could scarcely have been foreseen a few years ago. Its efficiency has been proved by a very large number of in-the-air trials, both in daytime and at night, involving a variety of aircraft. The future possibilities of flight refuelling for reducing take-off weight or runway length requirements, or even for permitting a reduced size of commercial aircraft to do a given job, offer stimulating food for thought.

In conclusion we would suggest that several sequences from the newly released colour film of refuelling in the air (shown to a small audience in London recently) should be provided with a suitable commentary and distributed to public cinemas.

WOLVERHAMPTON AIR DAY

The Goodyear Trophy Race and Coronation Air Display

"FLIGHT" PHOTOGRAPHS

THIS first important civil air meeting of the season gave no indication of the difficulties that are facing the Wolverhampton Aero Club and most other flying clubs throughout the country. The organizers are certainly to be congratulated on an excellent programme of entertainment; they were rewarded by a large and enthusiastic crowd and, after a threatening early morning, exhilarating sunny weather.

Eighteen of 20 aircraft entered for the Goodyear Trophy Race were on the starting line for the event of the afternoon; among them were most of the old hands, seeking not only to win a prize but to gain a good start in points towards the 1953 Air Racing Championship. The familiar figures of the officials and timekeepers were to be seen about their jobs, all at their efficient start-of-the-season best.

Strong, gusting wind and towering cumulus clouds of intense whiteness gave promise of a rough ride for all, and some advantage perhaps for the faster and heavier aircraft. The course was different from that used in previous years, being approximately 20 miles round (compared with almost 32 miles last year) with turning points at Coven Lawn, Patshull and Ackleton. Three laps were flown, and after take-off on the first a scatter-point had to be rounded before turning almost on a reciprocal course back over the airfield.

Geminis were notable for their absence, both Dunkerley and Somers having finally deserted their faithful twins.

First man away—in the only biplane—was A. Bough in a blue Tiger Moth. In spite of his six-minute handicap lead over all others he finished last. Several women were in the race, but only one—Miss E. L. Curtis in the Major 1 Wicko—was piloting. She finished twelfth at 121 m.p.h.

The first group to take off comprised the Leopard Moth (A. J. Spiller) and Willson's Messenger, both five seconds behind Jemmett's Hawk Trainer. The Leopard lost a second or two on the get-away, but quickly picked them up around the scatter-point and, in fact, slowly increased its lead on the other two throughout the race.

Bowles in the other Cirrus-Messenger 2A conceded 45 sec to the apparently similar aircraft. This year he has a coarse-pitch Fairey airscrew and was flying strictly at maximum continuous r.p.m. Its 127 m.p.h. average compared with 133.5 last year (for the rather longer race). Jemmett's Hawk, incidentally, averaged only 122 m.p.h. as against its previous 135 m.p.h.

Pat Fillingham, last year's Goodyear winner and Air Racing Champion, flying with his wife Sonja, had a handicap time of 8 min 45 sec, but averaged 9 m.p.h. less than last year. His Canadian-built Chipmunk now has a heavier R.A.F.-type tailplane, and he was not, we hear, able to use his favourite airscrew.

A prophetic gesture by Ron Paine as he waited his turn for the starter's flag. His Speed Six has an electric starter.

The group of Proctors was felt to have a very good chance of winning, and, in fact, between them they pulled off second and third places. They took off a few seconds apart, in the order: Bennett and passenger, Proctor 5; "Sailor" Parker, Proctor 5; Crowther, Proctor 3; Peter Hillwood, Proctor 1; and then A. S. K. Paine, Proctor 1. Averaging 142 m.p.h., just 2 m.p.h. more than Crowther—and 4 m.p.h. less than last year—Parker managed to gain second place. Crowther was third. Their best lap times were made on the second time round: Parker, 148.8 m.p.h.; Crowther, 149.3 m.p.h.

The next group comprised G/C. Grece, Nighthawk; Marler and Rush, Falcons; and, five seconds later, Dunkerley in D. J. Adie's Cirrus-Major Mercury with which he won the race two years ago.

Finally there were the two single-seaters, Ron Paine's well-known Hawk Speed Six and Nat Somers' white Mew Gull—so welcome back in racing—from which it received 2 min 55 sec. It was the Mew's first real outing since its landing prang at Shoreham, and at present it has only an old ex-Service Gipsy Six Series 2 engine. With more time spent in preparation it may well approach its original form, when it managed nearly 250 m.p.h. On this occasion its best lap was at 206.5 m.p.h.

GOODYEAR TROPHY RACE RESULTS

Race No.	Start No.	Reg.	Pilot, Aircraft and Engine	H'cap time m. s.	Av. Speed (m.p.h.)	Final Place
24	1	G-AMLH	A. Bough (Tiger Moth, G. Major 1)	0 0	93.5	18
48	2	G-AFJB	Miss E. L. Curtis (Wicko, G. Major 1)	06 00	121	12
39	3	G-AKPE	D. C. Jemmett (Hawk Trainer 3, G. Major 1C)	06 20	122	13
46	4	G-ACMA	A. J. Spiller (Leopard Moth, G. Major 10.2)	06 25	124	8
34	5	G-AJOE	H. C. Willson (Messenger 2A, C.Major 3)	06 25	118	17
35	6	G-AJYZ	W. P. Bowles (Messenger 2A, C.Major 3)	07 10	127	9
54	7	G-AKDN	P. Fillingham (Chipmunk 1, G.Major 10)	08 45	133	11
76	8	G-AHWU	D. J. Bennett (Proctor 5, G.Queen 2)	09 20	138	5
77	9	G-AHWR	G. R. I. Parker (Proctor 5, G.Queen 2)	09 35	142	2
74	10	G-AIEY	P. Hillwood (Proctor 1, G.Queen 2)	09 45	140	6
78	11	G-AKWV	J. P. Crowther (Proctor 3, G.Queen 2)	09 55	144	3
73	12	G-AHNA	A. S. K. Paine (Proctor 1, G.Queen 2)	10 25	144	7
93	13	G-AGWT	G/C. C. M. M. Grece (Nighthawk M.7, G. Six 2)	12 50	150	16
31	14	G-ADTD	G. C. Marler (Falcon M.3.B, G.Six 1)	13 00	155	14
95	15	G-AECC	S/L. J. Rush (Falcon Six, G. Six 1)	13 00	162	4
84	16	G-AHAA	F. Dunkerley (M.28.6, C.Major 3)	13 05	159	10
96	17	G-ADGP	R. R. Paine (Hawk Speed Six, G. Six I.F.)	15 30	186	1
97	18	G-AEXF	J. N. Somers (Mew Gull, G. Six 2)	18 25	199.5	15

The two lines of competitors at the start. In the foreground Somers runs up the Gipsy Six of his Mew Gull. Other competing aircraft can be recognized by shape and racing number — including the winning number 96, next to the Mew.

(Left) A winners' huddle, showing Mr. and Mrs. Bowles talking to Ron Paine immediately after he had won the race, and on the right, Sailor Parker who was second. (Right) Third man home was J. P. Crowther, Proctor 3 G-AKWV, here seen in his white cap beside the winner's Hawk Speed Six.

In 1937 the Mew won the Folkestone Trophy at 210 m.p.h. with a Gipsy Six Series 1, and later with a Six R (from the Comet racing aircraft) it was second in the Hatfield-I.O.M. race at 247.5 m.p.h. and third in the Manx Air Derby at 239. In 1938, with lowered canopy, and again with Alex Henshaw as pilot, it won the King's Cup at 236.25 m.p.h.

The Goodyear Race provided plenty of interest, but less excitement than in other years because there was little change in positions until the machines had all passed by for their last lap. Even so it was apparent on the positions at the first Wolverhampton turn that Parker and Crowther were going very well and that Rush was in the running.

After the final lap, as the specks of aircraft finally came into view very low and for the spectators, into the sun, it was first possible to see a low-wing machine out ahead. Almost at once there were cries all round of "It's Ron"; and, indeed, the local Throttle Bender, director of Wolverhampton Aviation, Ltd., and most regular competitor had at last pulled it off in his docile Speed Six. His speed was 186 m.p.h. (last year, when he finished eighth it was 190.5 m.p.h.); his prize the Goodyear Trophy and £100.

A whole batch of machines came through for the next places and, as already mentioned, Parker was second, Crowther third and Rush (another Throttle Bender) fourth. All the places and speeds are tabulated. Second and third prizes are £50 and £25.

Unfortunately the Mew could do no better than fifteenth place, in company with Marler's Falcon (14) which did not seem very happy. A middle bunch who had a good private race were the Wicko, Chipmunk and Hawk Trainer. Fred Dunkerley, who finished tenth, but was the first with Goodyear wheels, brakes and tyres, received the makers' special prize of £10. The prizes were presented by Mrs. H. L. Ginaven.

During the rest of the afternoon, before and after the race, visitors were treated to a number of interesting demonstrations. There was formation flying by V. R. Prentices of No. 16 R.F.S. Derby; a deck-landing demonstration by R.N.V.R. Seafires from Bramcote; and a fine showing of a Canberra (F/O. Clarke) of 139 Jamaica Squadron, R.A.F. Hemswell. These events were followed by the lively but contrasting displays of an Aiglet Trainer (S/L. Ranald Porteous, Auster chief test pilot) and a Meteor 7 which was competently flown by F/L. Titmus from C.F.S.

(Left) The winning Miles Hawk Speed Six and Percival Proctors grouped below and in front of the Wolverhampton club-house, as is the custom.

After the race the S.51 helicopter which had earlier brought Mr. John Profumo, M.C.A. Parliamentary Secretary, delivered a special edition of the local paper. Captain Cameron, B.E.A., was at the controls. In the evening Mr. Profumo went on to his next engagement by helicopter, but while at Wolverhampton he, Mr. Frank Beswick, and G/C. Wilcock, M.P., all spoke of encouragement to firms' sports clubs to support the M.C.A.'s scheme for recreational flying.

We believe, incidentally, that so far only ten firms in the whole country are participating in this scheme. Of this total, three are in the Wolverhampton district and are all based on the club. They are H. M. Hobson, Ltd., Reproducers and Amplifiers, Ltd., and the Rubery Owen Organization. The closing of No. 25 R.F.S. was, of course, a great blow to Wolverhampton and resulted in the loss of many good friends of the club. Derby, too, is losing its R.A.F. training schools but both airfields and their clubs look forward to "business as usual."

An additional event was the demonstration by Mr. C. T. P. de Vigne, chief test pilot of Armstrong Siddeley, of a Gannet. He switched the separate Mambas on and off like electric motors when flying level or diving, or even on the top of a loop.

As ever, the Patrouille d'Etampes gave a memorable exhibition of aerobatic formation flying, the more creditable in view of the very rough air conditions. Bramcote Seafires finally gave themselves and the vistiors to the display a rocket send-off.

AIRCRAFT GOLFING SOCIETY DINES

THE well-worn phrase, "A good time was had by all," certainly applied to the ninth annual dinner of the Aircraft Golfing Society, which took place the Savoy Hotel, London, on Friday, May 15th. The toast of "The President" was proposed by Mr. John Lankester-Parker, and Mr. Robert Blackburn responded. The health of the Society was proposed by Mr. K. V. Ross, of Abadan fame. He remarked, that during the difficult days in Persia, meetings at the golf club and on the course were one of the things that had helped the British to keep sane. Mr. Ernest Nash replied for the Society. The final toast of "The Guests" was ably handled by Mr. Brian D. Songhurst, honorary secretary of the A.G.C. (It had previously been learned that he was a scratch man when only 16 years of age.)

Of the distinguished directors, chief designers and test pilots who were present, it was left to S/L. Neville Duke to reply. This he did in a most engaging manner; by special request, and with some embarrassment, he described briefly his experiences of sonic flight. Previously he had said that test pilots had the greatest faith in the designers. He read a letter written to him from a village following the occurrence of a loud bang, but added that there were others who had the honour of taking part in making these disturbances. Of sonic bangs he said that he normally made two: one going in and one coming back, but that it was possible to make several by going in and out. It might be possible to cause bangs below the indicated Mach number of 1, and it was also possible to aim the bang at, say, Dunsfold, by slowing down through Mach 1 when pointing in that direction, even though no bang had been heard on accelerating up.

Before, during, and after dinner the evening was devoted mainly to a variety of entertainment and conviviality.

FROM ALL QUARTERS

Sunderlands for New Zealand

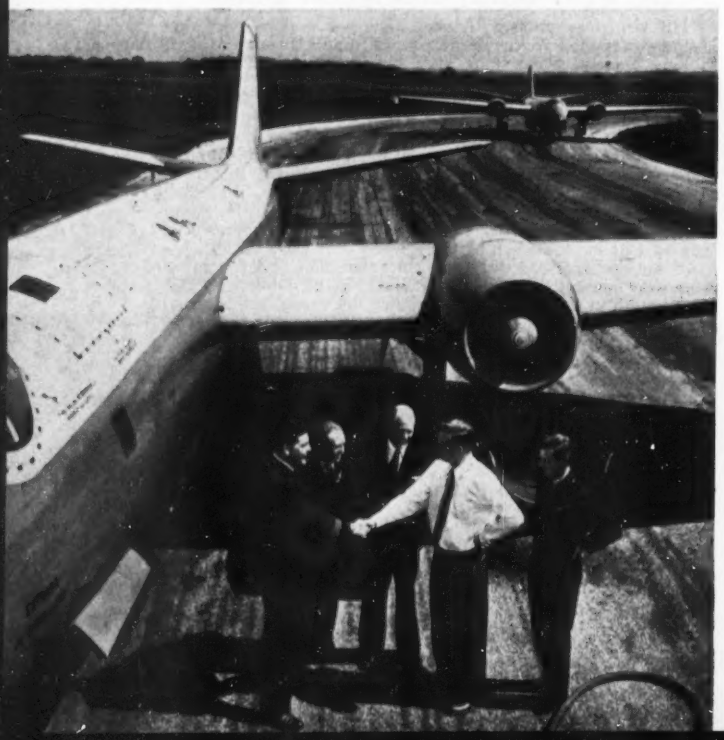
MOORED last Monday morning on the Long Reach, near the old airship station of Kingsnorth, lay a spruce Short Sunderland M.R.5, her serial number NZ4105 proclaiming her nationality. She had flown down from Belfast on the previous evening for her official reception—as the first of 16 of her kind—by Mr. E. B. Corbett, Minister of Lands and Maori Affairs. Later in the morning her log-book was handed over to Mr. Corbett by Rear-Admiral M. S. Slattery, chairman of Short Brothers and Harland, Ltd.

The Sunderlands—all of them completely reconditioned—will be used for long-range reconnaissance and for the delivery of emergency medical supplies and other kinds of assistance to the scattered Pacific islands. They will operate from Auckland and Fiji.

The makers remark that further development of the flying-boat as a military aircraft has been prevented by the lack of one having a performance comparable with that of the Neptune or Shackleton, and also by the understandable reluctance of aircraft manufacturers to embark on extensive research and development without the assurance of an order. Therefore, they rightly point out, if a maritime reconnaissance flying-boat is required, then the Sunderland is left as the outstanding example in service.

Technically the New Zealand Sunderlands are of unusual interest in respect of their Marconi radio which is more extensive even than that of the Comet. There are twin AD.107A HF transmitters, two AD.94 MF/HF receivers, an AD.107 MF transmitter and twin AD.7092A radio compasses. Each aircraft has two Type AD.401 intercommunication systems which permit selective calling of crew-members from any of the stations by means of press-buttons and call lights. The system is extended to connect with what are best described as "outside lines"—the transmitters, receivers and navigational aids. In emergency, a special switch alerts all stations on the circuit, fades out any services in use at the time, and automatically increases volume to maximum. There is a second intercommunication system which links members of the anti-submarine team. Individual members of the team can either select this system or listen on the main circuit. Standard R.A.F. maritime reconnaissance radar is installed in addition to radar navigation aids and a radio altimeter. Provision is made for a Loran receiver, and homing aids include a radio-range receiver and fan-marker receiver. Three Sunderlands are due for delivery to New Zealand during May, and thenceforth two will be delivered per month until the contract is completed. Of the 748 Sunderlands built since 1938, a considerable number are still in store at Wig Bay.

EN ROUTE to Venezuela on a routine delivery flight, two Canberras for the Venezuelan Air Force (see page 597, "Flight," last week) called at Friendship Airport, Baltimore, to refuel. In the group are Capt. J. W. Hackett, pilot; Peter Moneypenny, navigator; Capt. Barry Damon, pilot; Glenn Hobday, English Electric representative at the Glenn L. Martin Co.; and A. D. McLachlan, navigator.



Jeffrey Quill's New Post

FROM Vickers-Armstrongs Ltd., comes news that Mr. Jeffrey Quill, O.B.E., A.F.C., has been appointed to the position of sales and liaison manager of their Supermarine Works. Mr. Quill was Supermarine's senior test pilot for many years until he was "grounded" by ill-health in 1947, and subsequently he has been chief liaison officer. He joined Vickers (Aviation), Ltd., in 1936 as assistant test pilot to Mr. J. ("Mutt") Summers. He did much of the development flying work on the prototypes of the Wellesley, the (Vickers) Venom and the Spitfire, and in 1938 transferred permanently to Supermarine, where he was in charge of all development test flying until the summer of 1947. During these years he was responsible for the test flying programme of the Spitfire in its various marks, and in 1946 he carried out the first flight in Supermarine's first jet fighter, the Attacker.

Mr. J. K. Quill.

During the war Mr. Quill at first served in No. 65 (Fighter) Squadron in the Battle of Britain, and in 1943-44, having transferred to the Navy, he served as an R.N.V.R. lieutenant-commander in aircraft carriers.

He will have to assist him in the sales and liaison department Mr. J. Rasmussen, M.B.E., Mr. Murry White and Mr. M. Scott Mackirdy.

The Anglo-American Conference

THE Royal Aeronautical Society announces that arrangements are now in hand for the Anglo-American Aeronautical Conference, to be held in London from September 15th to 17th. Most of the American visitors will arrive in this country during the previous week to watch the S.B.A.C. Display at Farnborough. The first R.Ae.S. function they will attend will be the Wilbur Wright Memorial Lecture on September 14th.

In addition to the Conference lectures, a number of visits and social functions will be arranged.

The following is a list of the papers to be read at the Conference :—

American.—*The Control of Flight*, by Preston R. Basset (Sperry Gyroscope Corporation); *Structure for High-speed Aircraft*, by Hall L. Hibbard (Lockheed Aircraft); *The Problem of Fatigue of Airplane Structures*, by R. V. Rhode (N.A.C.A.); *Some Factors Affecting Helicopter Design and Future Operations*, by R. H. Miller (Kaman Aircraft; *Pod Mounting of Turbojet Engines*, by George S. Schairer (Boeing); *Boundary-layer Control*, by Courtland D. Perkins (Princeton University).

British.—*Structural Adhesives for Metal Aircraft*, by Dr. N. A. de Bruyne (Aero Research, Ltd.); *Thermal De-Icing of Aircraft*, by J. L. Orr (Canadian National Aeronautical Establishment); *Introduction of the Comet into Service*, by A. C. Campbell-Orde (B.O.A.C.); *Aerodynamics of Compressor-blade Vibration*, by H. Pearson (Rolls-Royce); *Power Plants for Helicopters*, by Capt. A. Graham Forsyth (Fairey); *Development of a Family of Delta Aircraft*, by S. D. Davies (A. V. Roe); *Basic Prerequisites Essential to Production*, by R. A. Neale (Canadair).

Open Day at the N.P.L.

THE annual Open Day at the National Physical Laboratory, Teddington, was held on Friday, May 15th, and a number of interesting new items in the field of aerodynamics were to be seen in addition to those already familiar from past visits.

So much high-speed wind-tunnel research is now taking place, at the N.P.L. and elsewhere, that a relatively cheap and quick, yet accurate, method of making three-dimensional swept- and delta-wing models has become essential. A new process has been introduced, whereby a precisely dimensional mild-steel blank is milled into a number of tangential planes, the majority of them around the leading edge, and then hand-finished with fine emery cloth.

SPEED AND RELIABILITY

in the recent

R.A.F. Bomber Command Exercise "Jungle King"

"Interception of Canberra bombers flying at maximum height was negligible by day and none took place at night . . .

Throughout the exercise not one case of engine failure was reported among the large force of Canberras taking part"

Air Chief Marshal Sir Hugh P. Lloyd, K.C.B., K.B.E., M.C., D.F.C.

English Electric Canberras are powered by Rolls-Royce Avon turbo-jet engines

ROLLS-ROYCE

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ENGINES

ROLLS-ROYCE LTD, DERBY, ENGLAND.

Goodyear Trophy

AIR RACE

FLOWN AT WOLVERHAMPTON ON

SAT. MAY 16th WON BY MR. R. R. PAINE

IN CORONATION YEAR FAMOUS GOODYEAR TROPHY GOES TO

Mr. R. R. Paine

WHO FLEW A

HAWK SPEED SIX

Second Mr. G. R. I. Parker

Third Mr. J. P. Crowther

Congratulations to the winners and to the other pilots whose skill and initiative made this one of the outstanding flying events of the year.

GOODYEAR

AVIATION PRODUCTS

Goodyear Tyre & Rubber Company (Great Britain) Ltd., Wolverhampton

FROM ALL QUARTERS . . .

A typical wing of, say, 3in chord would require something of the order of 30-40 planes to be cut. Dimensional accuracy is then assessed by a newly-developed optical comparator, and it has been found that the contour of the finished article normally lies within an envelope 0.001in thick around the desired profile.

Two new subsonic and supersonic wind-tunnels were on view, both operated by compressed air : working sections were, respectively, 18×14in and 9×3in. The highest-speed tunnel at the N.P.L. is still the 2.6×1.5in, which is capable of providing an airflow at Mach 4. A series of first-rate Schlieren photographs, some in colour, were available to illustrate the results obtained from the various tunnels.

Of the instruments employed for obtaining data during wind-tunnel tests, the most interesting was a new traversing yawmeter for boundary-layer exploration. It can be electrically adjusted to a precise distance above or below an aerofoil, and rotated so as to face "into wind" when a swept or delta surface is being investigated; the probe of the instrument has two tubes instead of one, so that a setting to the correct flow-angle is signified by a balanced pressure-reading.

The Duke at Hawkers

ON Tuesday last, H.R.H. the Duke of Edinburgh visited the Hawker factories at Canbury Park Road and Richmond Road, Kingston-on-Thames, and saw the Hunter in production. He was received by Sir Frank Spriggs (chairman of the Hawker Siddeley Group), and after his tour he lunched at the firm's guest-house on Kingston Hill. In the afternoon he went to Dunsfold, where he saw a Hunter demonstrated by S/L. Neville Duke. He also watched a formation of three Hunters and named WT555 the first production machine. There was, too, an array of historic Hawker Aircraft.

Sir Wilfrid Freeman

WE regret to record the sudden death, on May 15th, of Air Chief Marshal Sir Wilfrid R. Freeman, Bt., G.C.B., D.S.O., M.C. Sir Wilfrid had a long and distinguished career. He took his pilot's certificate in 1913 and served throughout the First War in the R.F.C. and the R.A.F. By the present generation, however, he will be chiefly remembered for the part he took in guiding and developing the aircraft industry during the vast and hectic expansion of the R.A.F. from 1936 onwards. From 1942 to 1945 he was Chief Executive at the Ministry of Aircraft Production, and it was for his outstanding services in this post that he received his promotion to G.C.B.

Sir Wilfrid Freeman.

Holland's Hunters

THE Netherlands Defence Minister, Mr. C. Staf, has said that it is hoped to have the first Hawker Hunters to be built in the Low Countries (with the help of the American offshore-purchases plan) coming into production about June 1956. In this connection, Holland and Belgium jointly are to build 424 of a total of 1,689 jet fighters for which contracts have been placed.

In making his announcement, the Defence Minister stated that adherence to the projected date of June 1956 was, however, dependent on the timely delivery of the engines (Belgium's part of the joint work) and on the availability of machine tools.

Helicops

AN interesting experiment took place last week, when the police of two counties co-operated in trying out a Bristol 171 helicopter for the detection and apprehension of car bandits. A widely used make of car—a Standard Vanguard—was "stolen" from a car park at Silverstone race track and was later used for a "smash-and-grab raid" at Towcester. The helicopter was assumed to be helping with traffic direction at Silverstone, and it was there that it received an emergency call. Details of the car were broadcast, but only one sighting report was relayed to the helicopter after the raid at Towcester. Even so, we hear, the machine (which carried three passengers including the pilot, and a police radio set) located the fleeing robbers, in a matter of minutes' some miles from Towcester, shadowed them, and succeeded in directing two police cars from different directions in such a way that they cut off the Vanguard and caught the thieves.

"FLIGHT" NEXT WEEK

REPRODUCED in miniature here is the cover of the May 29th issue of *Flight*, which, as a tribute to Her Majesty, will be devoted almost wholly to "The Queen's Air Forces." Greatly enlarged, and illustrated with numerous photographs in colour and photogravure, it will review in detail the duties and equipment of Britain's various air arms. The demand is certain to be heavy, so readers should place orders with their newsagents in order to avoid disappointment. Price will be 1s 6d.

"Glory's" Achievement

THE Admiralty has announced that the light fleet carrier H.M.S. *Glory*, 13,190 tons, has now completed the longest period of naval air operations by any British Commonwealth ship in the Korean campaign. She left Britain in January 1951 and since that date has steamed 157,000 miles during 530 days spent at sea.

In this period, 15 months have been spent on war service and 13,700 flights made from her deck—9,500 of them as operational sorties over North Korea.

Records for Miss Cochran

IF reports received from Los Angeles on Monday are accurate, Miss Jacqueline Cochran has (subject to F.A.I. confirmation) broken both the world speed record for the 100-km closed circuit and the woman's record in the same category.

Miss Cochran achieved this distinction by averaging 652.337 m.p.h. in a Canadair-built F-86E Sabre, believed to have an Avro Canada Orenda turbojet; she is also said to have exceeded sonic speed, but this could only have happened at high altitude before or after the low-level closed-circuit flight.

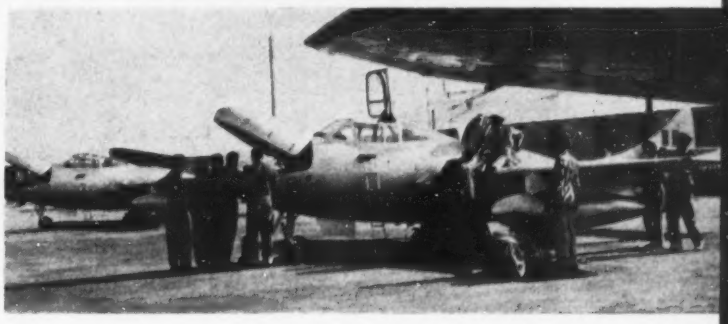
Previous records for this distance were: 634 m.p.h. (world, set by Capt. F. J. Ascani in a Sabre) and 532 m.p.h. (women's record, set by Mme. Auriol in a Mistral).

Miss Cochran recently joined the flight-test advisory staff of Canadair, Ltd. Her husband, Mr. Floyd Odlum, is head of Atlas Corporation, which recently sold a major holding of Consolidated Vultee shares to General Dynamics Corporation, which controls Canadair.

Semi-public Electronics

THE largest and most comprehensive display of electronic equipment ever exhibited was organized at the R.A.E., Farnborough, last week for the benefit of foreign Government and Service observers. Arranged by the Radio Communication and Electronic Engineering Association in collaboration with the Ministry of Supply, the display resembled the S.B.A.C. show—and was only slightly smaller. Indoor stands were occupied by equipment and component manufacturers, while outdoor displays comprised a vast amount of Army equipment and a number of representative aircraft.

STAGING THROUGH : Two of three Vampire trainers at Nicosia (Cyprus) on May 16th, on their way to the Indian Air Force. The aircraft have the old-type canopies but the new tail fins of extended area. R.A.F. markings, apparently, were displayed.



HERE AND THERE

TERMINUS TERMINAL: B.E.A.'s new London terminal, situated on the north side of Waterloo Station; it was formerly one of the entrance buildings to the South Bank Exhibition site. First used by passengers early this week, it was due to be officially opened yesterday, May 21st, by the Minister of Transport, Mr. Lennox Boyd.

Appointed

THE QUEEN has approved the appointment of Air Marshal Sir Thomas Elmhirst, K.B.E., C.B., A.F.C., as Lieutenant-Governor of Guernsey. He retired from the R.A.F. in 1950.

Elected

AMONG five vice-presidents of the Institute of Transport recently elected for 1953-54 is Mr. Peter Masefield, chief executive of British European Airways.

Family Outing

B.O.A.C. and one of their pilots, Capt. Gerald Austin, lay claim to a novel "double record": an Argonaut on a pilgrim flight from Bahrain to Israel carried 24 passengers, all closely related and including four generations; the great-grandmother was 105 years old!

Film Hustler

IT is now known that the helicopter which will be used on the first stage of the Coronation-film "airlift" (see *Flight*, page 596, last week) will be one of the Bristol Sycamore Mk 13s supplied to R.A.F. Fighter Command. The Command's Helicopter Unit is moving to North Weald, where it will remain until after the Coronation; it is shortly to be inspected by the Secretary of State for Air.

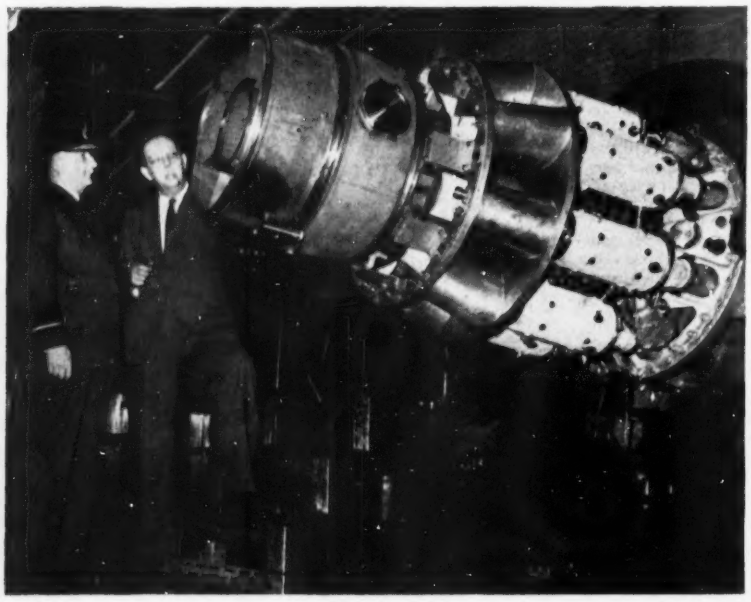
Korea Flare-up

PANMUNJOM talks notwithstanding, considerable air activity has continued in Korea. On May 13th some 200 American Thunderjets and Sabres used both bombs and rockets to attack a big supply centre 60 miles from the Manchurian border. There was no Communist fighter opposition, but in operations during the next four days 23 Mig-15s were claimed as destroyed.

Canadair-Consolidated Chiefs

FOLLOWING the recent news (see *Flight*, April 17th) of an arrangement whereby General Dynamics Corporation—the American parent company of Canadair, Ltd.—will acquire majority holdings in Consolidated Vultee Aircraft, it is now announced that Frank Pace, Jr., has been appointed executive vice-president of General Dynamics. Formerly Secretary of the U.S. Army, Mr. Pace will also become a vice-chairman of Canadair. Vernon J. Welsh, formerly of General Electric, becomes vice-president (communication) of General Dynamics and chairman (communication) of Canadair.

REVEALING VIEW of a Proteus for Air Chief Marshal Sir John Whitworth Jones, Air Member for Supply and Organization, who recently visited the Bristol works. With him is Dr. S. G. Hooker, director and chief engineer, engine division.



Gliding in Miniature

AFTER recent final trials at Kidlington Airfield the British team for the World Model Gliding Championships (Jugoslavia, August 23rd) has been chosen by the S.M.A.E. as follows: G. C. M. Boyd and G. W. Linford, of Loughborough College; M. Hanson, of Solihull; and A. J. Brooks, of the R.A.E. Apprentices' Hostel, Farnborough.

Even Numbers

"TO promote the adoption of a consistent procedure in the presentation and interpretation of numerical values, particularly in regard to the number of figures to be used and the procedure for rounding" is the object of a new British Standard published by the B.S.I. Copies are obtainable, price 3s, from the Institution's sales branch at 24, Victoria Street, London, S.W.1.

Warned Off

HEADED "Flights over Large Assemblies of People", an M.C.A. *Information Circular* issued last week observes that during the next few weeks "there will be numerous occasions on which large assemblies of people will gather in the open air to watch public events," and reminds pilots that the Rules of the Air expressly forbid flight over such gatherings. Permissible exceptions—such as air displays and races—are quoted from the regulations.

Destructive Supersonics

IN a letter to *The Times* on the aural effects of supersonic flight, Mr. A. H. Yates (a senior lecturer in aerodynamics at Cranfield, and an occasional contributor to *Flight*) gives it as his opinion that an aircraft flying low at supersonic speed—perhaps only 100 m.p.h. faster than at present—"would create havoc not only with our eardrums but by material damage to our homes." He calculates that the shock-wave from a machine flying supersonically at 1,000ft represents a sudden pressure-change of about 10 lb/sq ft.

Highest Ever!

ROTAX Starting Equipment
was fitted to the Bristol Olympus engines
of the

CANBERRA

which, on May 4th, 1953
attained the new altitude record of

63,668 *ft.*

(Subject to Official Confirmation)

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which attained the new altitude record of

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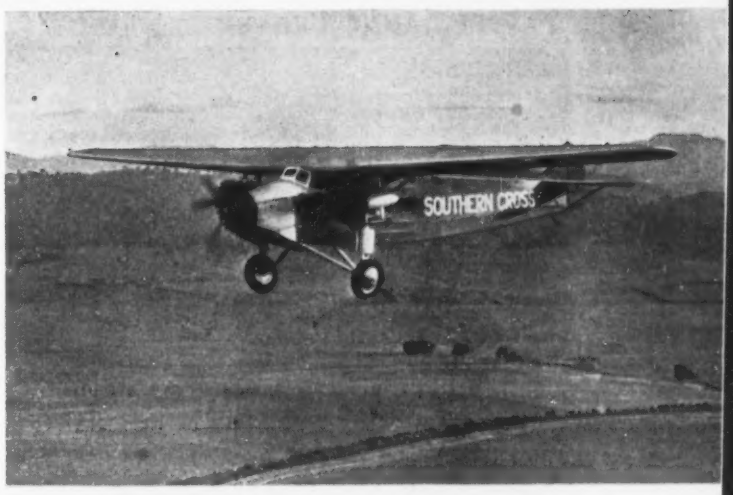
PACIFIC ANNIVERSARY

Kingsford-Smith's Great Flight of Twenty-five Years Ago

By JOHN SIDNEY



The "Southern Cross"—Kingsford-Smith's Fokker F.VII 3m.

TWENTY-FIVE years ago—on May 31st, 1928, Charles Kingsford-Smith set out in the famous "Southern Cross"—a Fokker F.VII 3m (three-engined version of the eight-seat F.VII), over the Golden Gate, San Francisco, on the first hop of his epoch-making flight across the Pacific. He was accompanied by Charles Ulm, who was to be co-pilot on so many other flights, and two Americans, James Warner and Harry Lyon. In this article—by an Australian contributor—the great feat is vividly recalled.

IF you measure the distance from Sydney to San Francisco in terms of a knob on your radio, or a comfortable three-day Clipper flight, you may find it hard to understand why nearly one in every three of Sydney's then population of a million was out at Mascot Airfield to see Smithy set down the "Southern Cross." The crowd of 300,000 gathered there was paying tribute to a pioneer : these were the men who had flown the Pacific for the first time in history.

They had done the job the hard way. Only seven weeks before they took off, Smith and Ulm had been flat broke in Los Angeles —not even a few pence in their pockets for cigarettes or food, and hard put to it to dodge their creditors.

They had arrived in San Francisco on August 5th, 1927, backed by the New South Wales Government to the extent of £5,000, and by a Sydney newspaper. Smithy fervently believed in eliminating all unnecessary risks, so he set about making sure that he had the best aircraft and the best crew and that he himself was in the best possible flying condition.

For the big flight, he wanted a Fokker with three Wright Whirlwind engines. Byrd and Floyd Bennett had flown over the North Pole in 1926 in a Fokker; Maitland and Hegenberger had flown from San Francisco to Honolulu in 1927 in one equipped with three such engines : Lindbergh had flown the Atlantic on the power of a Whirlwind engine.

Sir Hubert Wilkins offered them a Fokker for £3,000—without engines, without instruments. If they had paid the price—it was almost all they had—there would have been no money for the engines or instruments. Sidney Myer, Melbourne department-store owner, came to the rescue with £1,500 and, as they were still short, Wilkins agreed to accept half the purchase price as a down payment. Smith and Ulm were then able to proceed with the purchase of equipment for the journey. Three J5C 220 h.p. Wright Whirlwind engines were ordered and two top-ranking American mechanics, Salzman and Hedinger, were engaged to supervize the installation of the engines in the F.VII monoplane which the world came to know later as the *Southern Cross*. They sought out the best radio transmitting and receiving gear on the market, with special emphasis on lightness.

"The secret of success," Smithy said in his book, *My Flying Life*, "depends on the perfection of one's plans."

And so he went ahead—even in the face of opposition from the Australian Press, and from Americans who denounced the flight as "foolhardy." But a far greater obstacle was the recurring shortage of funds. Soon, Wilkins needed the remainder of the £3,000 for his Antarctic expedition.

To earn money, the desperate Australians decided to attack the world's sustained flight record of 52 hours 22 minutes, which had been set up in 1927 by two Germans, Edzard and Risticz. They flew to Santa Monica and filled the *Southern Cross* with 1,522 gallons of petrol. She then weighed seven tons instead of the usual five. They managed to lumber into the air, and the marathon was on. Kingsford-Smith and his American co-pilot, Lt. G. R. Pond, flew in a 50-mile circuit over San Francisco Bay. They kept it up for 50 hours 4 minutes, and then they had to land. They had failed by 2 hours 18 minutes.

It looked as though the only thing left to do was to sell the *Southern Cross*. One January morning in 1928, they flew her to Los Angeles (they could not have paid the rail fare). Negotiations for sale to the Union Oil Company of California fell through, and it seemed that Smithy was really beaten this time.

Weeks later, in March, they were out at Rogers airport. There, Andrew Chaffey, the President of the Californian Bank of Los Angeles, introduced them to Captain G. Allan Hancock, a wealthy Californian. Hancock offered to back them, and started by buying the *Southern Cross*. He advanced funds for the great flight, and from then on things went smoothly. The aircraft was taken to the Douglas factory of Santa Monica, where Mr. C. C. ("Doc") Maidment, the service engineer of the Wright Aeronautical Corporation, took charge of the service operations. He had been Lindbergh's engineer.

The *Southern Cross* was fitted with six tanks with a total capacity of 1,298 U.S. gallons. The main tank in the fuselage contained 807 gallons, a tank under the pilot's seat contained 107, and the other four tanks, located in the wing, carried the balance. At full throttle, the *Southern Cross* would do 120 m.p.h.: for safety's sake, Smithy based his calculations on a 90 m.p.h. basis. Petrol consumption was 32 gallons an hour—which meant that they carried enough fuel for 40½ hours. The F.VII, therefore, had a range of 3,645 miles, a conservative figure which gave a margin of 500 miles over the longest hop they faced. If they *were* forced down in the sea, they hoped to be able to cut away the 71ft 8in all-wood wing and use it as a raft. Emergency rations and a water distillation plant were stored in the wing for the same eventuality. Added to the radio equipment was an emergency transmitter with an aerial to be taken aloft by a kite.

Wireless beams were to be sent out from Crissey Field, California, towards Honolulu, and from Honolulu towards San Francisco. Smithy planned to fly along the Crissey beam from San Francisco, and then to pick up the one from Honolulu to conclude the hop. The Americans, Capt. Harry Lyon and James Warner, shipmates who had seen service in both the U.S.A. Navy and the merchant navy, were navigator and radio operator. Lyon planned to navigate by dead reckoning and taking sights of the sun and the stars, with Warner keeping check of the beam.

So Smithy completed his programme for a record flight. This was his "big feat" which, he says, he dreamt of in 1927—"the feat which should bring us what we wanted, fame, money, status." To which he adds, "We wanted also to do something which would not only advance aviation and confound the sceptics, but something that would bring fame to our country."*

Six weeks after the meeting with Hancock, all was ready. On May 30th, the weather was pronounced good. They took the air at six minutes to nine the next morning, May 31st. Kingsford-Smith and Ulm sat in wicker seats in the cockpit, with Lyon and Warner in the fuselage behind. The roar of the three engines made speech impossible : notes were passed between the cockpit and the fuselage, and between the pilots themselves. And there could be no smoking.

At noon they had covered 340 miles, and the pilots took it in turn to doze in their chairs. By six o'clock they were 700 miles out. They roared on over the Pacific towards Honolulu till midnight.

Then they struck rain and heavy cloud at 4,000ft. They climbed

* "*My Flying Life*" (*Melrose, London*, 1937).

PACIFIC ANNIVERSARY . . .

out of the rain to 4,800ft, flying blind. Two hours later, a ship was sighted : Smithy signalled her on the Fokker's searchlight, and received in reply a signal which gave her name as *Maliko*—one of the Matson Bay line. They got a radio bearing from her and flew on into the night. Not long after, they were in contact with another ship, again a unit of the Matson Bay line, the *Manoa*. These were the only two ships sighted in the whole 6,438 miles to Australia.

Dawn came about six o'clock, with the *Southern Cross* driving on with a great cloud floor immediately beneath her, and the Pacific another 6,000ft below that. Petrol was checked and found to be O.K. According to Lyon's calculations, land was only 330 miles away, and three hours later at 9.14 a.m. (Hawaiian time) they sighted the snow-capped tip of Mauna Kea (12,000ft) far away on the port bow. Forty-five minutes later, they landed at Wheeler Field, tired, avid for a smoke, and deaf from the engine roar which had throbbed in their ears without a moment's break for 27 hours 27 minutes.

Smithy had arranged to take off the next morning, not from Wheeler Field, but Barking Sands, another field which had been recommended as better, and safer for the purpose. At 5.20 a.m. the *Southern Cross*, loaded with 1,300 gallons of petrol, faced the longest hop that had ever been attempted—3,713 miles of virgin air, Honolulu to Suva. Wheeler Field was sending out a beam which it was hoped to be able to ride for the first 700 miles. From then on, the course of the *Southern Cross* would be plotted from dead reckoning by navigator Lyon.

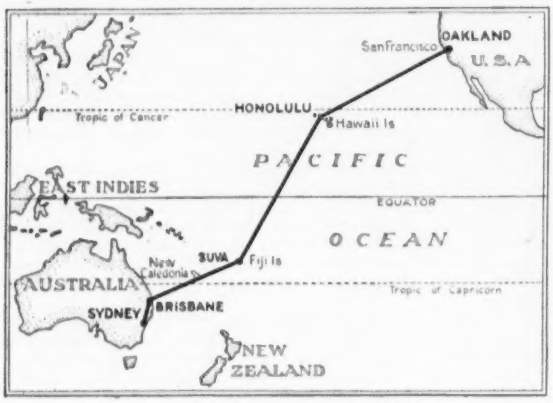
A short distance out, Ulm drew Smithy's attention to something trickling along the wing towards the cockpit. In a moment a drop of fluid fell inside. That was a tense moment. Thoughts of fire and forced landings in the sea flashed through the minds of both men. Smith handed over to Ulm, dipped his finger in the trickle, and placed it in his mouth. It was water.

After only three hours' flying, they lost the beam from Wheeler Field; two hours later, Warner reported the radio out of order; an hour later again, they got a tailwind and rainstorms followed. Wind and rain buffeted them, and the monoplane leaped and tossed and dived as Smithy tried to dodge the storm. One of the main factors contributing to Smithy's repeated successes was his consummate skill in instrument-flying. For more than an hour he fought the storm; and Lyon estimated that they had covered 630 nautical miles. By 1 p.m. Warner had both transmitters working satisfactorily. There was now a reasonable chance of being able to make accurate calculations.

All went well again till 3.30 that afternoon. Suddenly the starboard engine coughed, spluttered, kicked. Then it roared on. Then it coughed again, and the coughing and spluttering lasted for eight minutes. All this in mid-air, one thousand miles from the nearest land. Then, just as suddenly, the engine resumed its even rhythm.

That was the first and only time that the thunder of any of the engines was interrupted in the whole trip. Smithy never knew exactly what had caused it, but thought that a temporary blockage of a fuel filter was the most likely reason.

At 5.30 p.m., after twelve hours' flying, they had covered one-third of the distance—1,080 sea miles. From six o'clock till midnight they fought their way through pouring rain which drove through the windshield and soaked the pilots from the knees down. Twisting, turning, and climbing, they strove to dodge the deluge and climbed to 8,000ft, though this was eating up petrol. Then, suddenly, they shot into clear skies—and there were the four stars and the pointer of the Southern Cross. This they took to be a happy omen. About this time, too, they crossed the Equator.



The route taken by the "Southern Cross."

The crew (left to right): Jim Warner, Charles Ulm, Charles Kingsford-Smith, Harry Lyon. The photograph was taken at Sydney shortly after the famous flight.

Although they had expected to sight the Phoenix Islands, they never caught a glimpse of even one of the eight islands of the group.

They flew on through the night. At dawn they struck a giant thunderstorm, with lightning flashing up to 12,000ft. They could not climb to that height, so they went down to 400ft. Warner had to reel in the radio aerial. But it was no better there, so up they went again, into the lightning, still flying blind. Under these conditions, it was almost impossible to navigate accurately : for hours they had been unable to take a sextant reading of the stars. But Lyon's dead reckoning placed them, after 24 hours' flying, at 690 sea miles from Suva. At a rate of 100 m.p.h. this was about seven hours' flying time. It is a striking testimony to Lyon's navigation, that, just seven hours later, they did actually sight Exploring Island. Smithy was asleep. Almost immediately afterwards, they crossed the international date line, and it was no longer Sunday, but Monday.

Tired as he must have been after 30 hours in the air, Smithy nevertheless landed the *Southern Cross* on the tricky Albert Park Sports Oval, Suva, without incident, at 2.20 p.m. (Suva time).

The crew had had, in their leader's own words, "the thrill of being the first to fly into this region." They had flown 2,756 nautical miles (3,713 land miles) in 34 hr 50 min. Two of the three hops of the trans-Pacific flight had been accomplished in 62 hr 17 min.

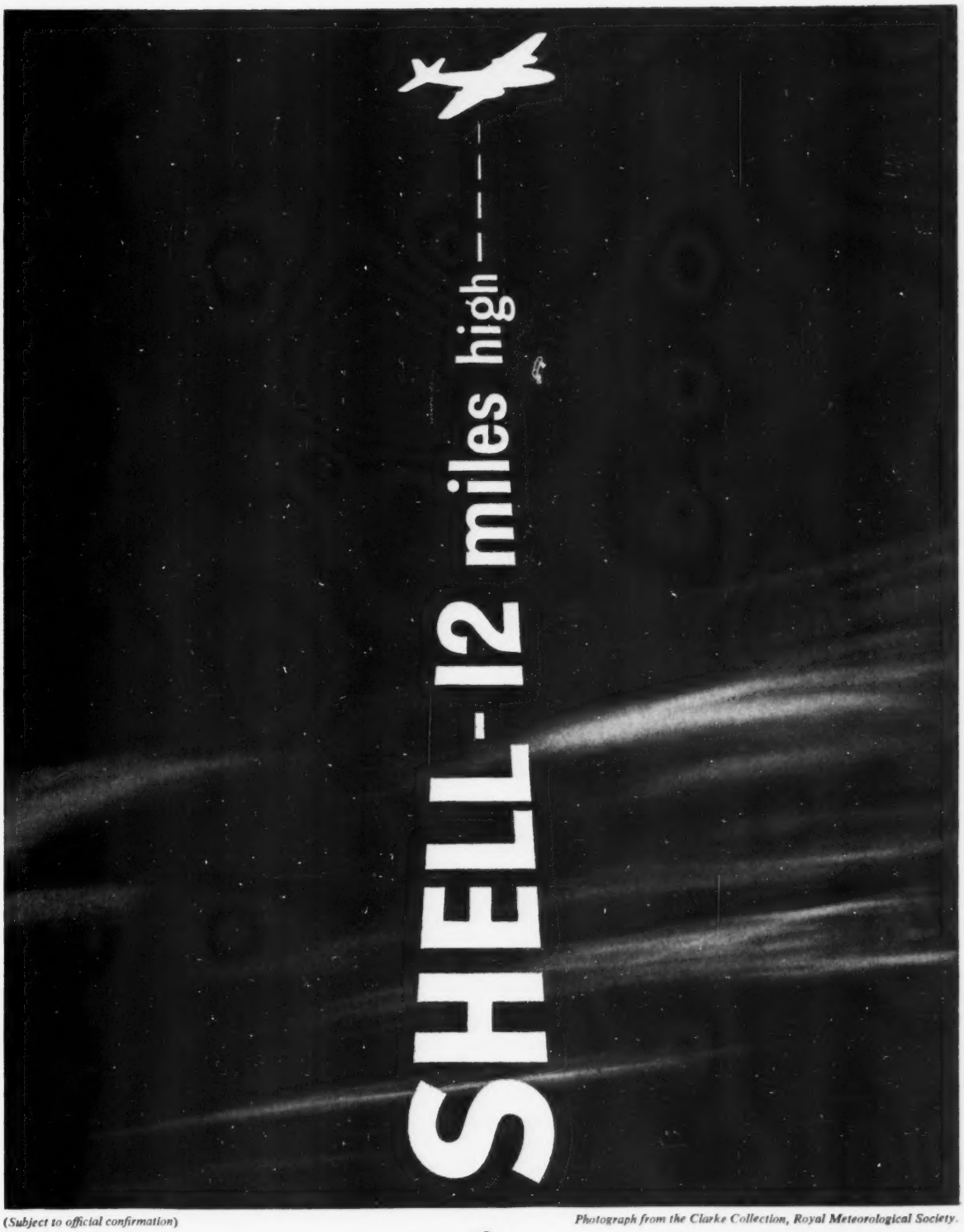
Now, they faced the last hop, from Suva to Brisbane, 1,737 miles away, about 17 hours' flying time. As the Albert Park Sports Oval was useless for a full-load take-off, Smithy subsequently decided on Naselai Beach, 20 miles away. He flew the F.VII there, but bad seas held up the transfer of 900 gallons of petrol which had to be taken to the beach from a launch in native surf boats. This cost them a day, and they took off at three p.m. on Friday, June 8th.

For three hours they made good progress at 4,000ft, but at 6.30 they hit violent electrical storms. They climbed to 7,000ft, but once again, it was no better up top. The aircraft kicked and tossed and bumped till midnight. Blue flames sizzled off the plug leads on all three motors, and they began to wonder whether the magnetos would be flooded. Once again, on account of the desperate climbings, twistings, and dodgings, navigator Lyon had no chance to take readings.

The downpour buckled the windshield, and again the two pilots were drenched. Although the storms abated round about midnight, the rain continued steadily till 4 a.m. When the sun rose, however, conditions were a little better, and Lyon took a sight, setting a course of 270 deg due west in the belief that they were on the parallel to Brisbane. This brought them, later, to Ballina, a town in New South Wales, 110 miles south of Brisbane—a mistake which they most probably would have avoided if their earth-inductor compass had been working. (In their battle to load the *Southern Cross* at Suva, they had forgotten to oil the earth-inductor compass—the only error they made in the whole flight.) They flew north and touched down at Eagle Farm airport, Brisbane, at 10.13 a.m. (Brisbane time). Flying-time from Suva to Brisbane had been 21 hr 18 min.

The South Pacific had been flown for the first time.

This is undoubtedly Smithy's story, but Ulm did his share.



(Subject to official confirmation)

Photograph from the Clarke Collection, Royal Meteorological Society.

THAT'S

Canberra beats World height record

Last Monday, May 4th an English Electric Canberra aircraft powered by two Bristol Olympus engines and piloted by Wing Commander W. F. Gibb, D.S.O., D.F.C., reached a height of 63,668', the highest any aircraft has ever yet been. The engines were fuelled by Shell.

YOU CAN BE SURE OF SHELL

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1. FEWER AIRCRAFT

Extra aircraft are not needed for flight refuelling. Taking only one example, when bombers are flight refuelled they carry a much heavier bomb load and, counting tankers as well as bombers, **fewer** aircraft are required for a given task.

2. NEGLIGIBLE EXTRA WEIGHT

Any aircraft fitted with a pressure refuelling system has 90% of the equipment required for flight refuelling. With no more than 15/30 lb. extra weight a fighter can be converted in **a few minutes** for probe refuelling.

3. TANKERS NOT A PROBLEM

Tanker equipment is being designed for installation as a "pack" in any suitable bomber or transport aircraft. Given the right engineering approach, a bomber can be converted into a tanker in **half an hour.**

In short, flight refuelling provides a simple, safe and economical method of increasing the range and striking power of aircraft. Little imagination is required to visualise its many possible applications to fighters, bombers, ocean patrol aircraft and virtually all types of operational aircraft.

FLIGHT REFUELLING LIMITED

TARRANT RUSHTON AIRFIELD, BLANDFORD, DORSET

PACIFIC ANNIVERSARY . . .

The flight occupied 83 hr 38 min flying time, of which Ulm flew about 30 hr. Smithy took the landings and the take-offs.

Ulm was to share other flights with Kingsford-Smith before he was lost at sea on a flight from Oakland, California, to Australia on December 3rd, 1934. These two flew together, also, in the *Southern Cross* on a non-stop flight from Melbourne to Perth in August, 1928, and from Derby to London in June, 1929. In June, 1930, Smithy flew the Atlantic from Portmarnock (Eire) to Grace Harbour (Newfoundland) and in October of the same year, he flew solo from Heston (England) to Darwin. In December, 1931, he flew the Christmas mail from Australia to England in 13½ days. He returned with G. U. ("Scotty") Allen in January, 1932.

In January, 1933, Smith, Taylor, and Stannage flew the *Southern Cross* from Sydney to New Plymouth, New Zealand in 14 hr 15 min. They made the return trip on March 26th in 13 hours. That same year, Kingsford-Smith flew a Percival Gull solo from London to Wyndham in 7 days 4 hr 47 min. This was a record for that time.

By his leisurely flight from Sydney to Oakland, October 20th to November 4th, 1934 (in a Lockheed Altair) Smithy became the first man to have flown the Pacific both ways. The last ocean flight of the *Southern Cross* was made on May 15th, 1935, when Kingsford-Smith, Taylor and Stannage set out from Sydney with freight and mails for New Zealand. When they were 650 miles off the Australian coast a large piece of exhaust-pipe came away and shattered the starboard airscrew. Smithy's quickness saved the engine from racing itself to pieces, but they had to turn round and started to limp back to Australia on two engines. They had a heavy cargo of mail, freight, and petrol, and the two engines at full throttle ate up the oil savagely. Several times it seemed that they would have to dump the mail and freight. Then at 8.55 a.m. (they had taken off at 12.25 a.m.) the port engine began to knock badly. They had no choice now but to dump the cargo Smithy had tried to save. A few minutes after midday, the port engine began to die.

Smithy dragged off his flying-boots, saying, "Well, it won't be long now." About twenty minutes later, Stannage sent a radio message : "We're going in any minute now."

It was at this stage that Bill Taylor, fastening a line round his waist, climbed out on to the wing strut, where he proceeded to drain oil from the dead starboard engine. Then he had to transfer it to the port engine. He performed this desperate and astounding feat six times.

At 1.12 p.m. the nose engine began to fail, but they managed to hold on, and landed at Mascot at 4 p.m.

* * *

Sir Charles Kingsford-Smith himself was lost in the Bay of Bengal six months later when he was flying from London to Darwin.

His commercial ventures had failed because he was too early : governments and public alike were wary of backing something in which they had not sufficient faith. It is ironic that the very airlines he sought to establish are flourishing today, while Kingsford-Smith, having failed, was driven to taking passengers for 10s joy-rides in the veteran *Southern Cross* at agricultural shows. He was actually "barnstorming" when he received his knighthood in 1932.

Apart from blazing trails around the world, perhaps Smithy's greatest contribution to aviation was in showing that air travel could be made safe by the elimination of unnecessary risks.

BELL X-2 LOST

JEAN ("SKIP") ZIEGLER, chief test pilot of the Bell Aircraft Corporation, and Frank Wolko, a flight engineer, lost their lives on May 12 through an explosion aboard a Boeing B-50 which was acting as parent ship to the Bell X-2 supersonic research aircraft. The B-50 landed safely, but the X-2 is believed to have dropped unmanned into Lake Ontario. Although no photographs of the X-2 have been released, it is known to have had swept wings of stainless steel, a fuselage made of K-Monel (a nickel-copper-aluminium alloy), and to have been powered by a Curtiss rocket unit of 15,000 lb thrust and controllable by a power lever.

G/C. MOLE'S NEW VENTURE

RECENTLY back from the Bahamas, where he was Director of Civil Aviation, G/C. Edward Mole, B.Sc. (Eng.), A.F.R.Ae.S., is now beginning new activities as an aviation consultant in London. His aeronautical experience is extensive, having begun at the R.A.E. in 1927 and been followed by 21 years' flying and technical duties in the R.A.F. Early in the war he became Assistant Director of Repair and Servicing, Air Ministry, and spent six months in the U.S.A. planning maintenance arrangements for American aircraft supplied to the R.A.F. In 1942 he went to M.A.P., where he was in charge of technical development of the military transport gliders that ultimately played such an important part in the final phases of the war in Europe. In 1945 he was attached to B.O.A.C. as manager of their development flight for post-war transports, and subsequently he was posted to Transport Command as Chief Engineer Officer. Three years later he was appointed R.A.F. representative at the National Gas Turbine Establishment, and on his retirement from the Service in 1950 he accepted the Colonial Office Bahamas appointment mentioned above.

G./C. E L. Mole

G/C. Mole's practical flying experience is extensive : he has handled 115 different types, including jets, and has had considerable route-flying experience with B.O.A.C. and Transport Command. Another of his interests is private flying and gliding (he held several British gliding records in pre-war days), and he was recently elected chairman of the technical committee of the Popular Flying Association.

In his new sphere of activity, he states, he will be able to represent his clients' interests both here and abroad. His offices are at 31 Grosvenor Street, London, W.1 (Grosvenor 5902).

ALTIMETERS AND MOUNTAINS

WHEN the causes of aircraft accidents in mountainous regions are under investigation, consideration must be given to the accuracy with which height can be measured by the pilot. The standard altimeter is a pressure gauge connected to the aircraft static-pressure system and its indication of height depends on (a) the accuracy with which the static source is supplied with ambient atmospheric pressure (any error on this count is connected with "position-error correction" and is accurately known); and (b) the accuracy with which the atmosphere corresponds to the standard I.C.A.N. atmosphere on which the altimeter calibration is based. Non-standard temperature lapse-rates do not lead to large errors; but variations in wind speed at a given level, such as occur when air is crossing mountains, may lead to errors of several hundred feet.

A report entitled *Altimeter Errors*, by Dr. R. S. Scorer of Imperial College, has recently been published and describes an expedition to a mountainous area of North Wales which took place in September 1951 with the object of measuring the difference between the true height of an aircraft over a mountain and the height indicated by its altimeter. The organizers were the Departments of Meteorology and Aeronautics of Imperial College and assistance in the flying was given by members of the Empire Test Pilots' School and of the Surrey Gliding Club.

The aircraft chosen for the experiments were gliders—on grounds of economy, ability to land in small fields and low air speed—making accurate determination of air position possible. The "tape-measure height" of a glider, at the instant when the pilot reported by radio that he was reading his altimeter was calculated from the azimuth and elevation readings of two theodolites which were used to track the glider from the ground. The error in this height was of the order of 3ft only.

The altimeter reading was corrected for instrument error, for position error and for the lag in reading due to rate of descent, if any, and the final results compared with the tape-measure height. The results were not entirely satisfactory, but errors of up to 30ft were measured during the tests.

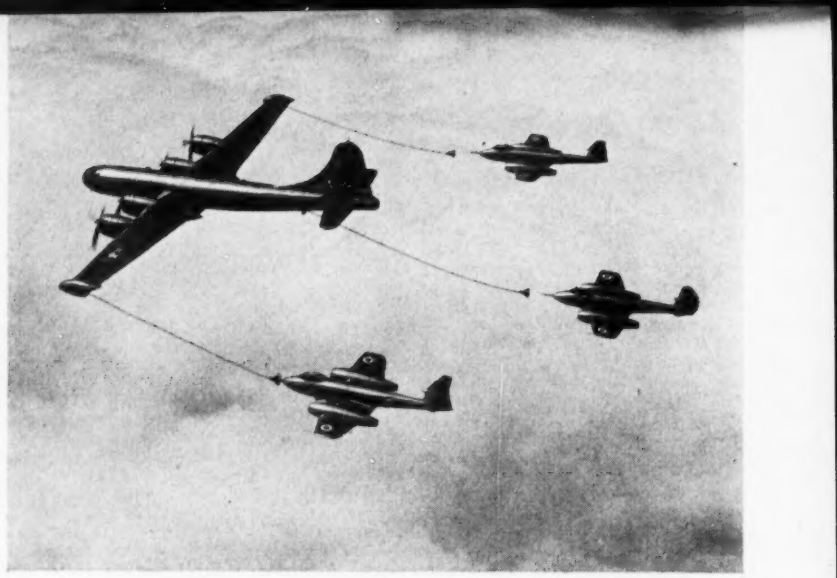
Measurements of the wind-strengths at various heights were made by tracking balloons with the theodolites, but observations of the motion of the glider (the air-speed of which was known) would have given equally accurate information.

The report concludes that it has been demonstrated that, if an aneroid barometer (preferably more accurate than a sensitive altimeter) is carried in a glider, the true height of which is measured by ground observations, then the altimeter errors due to the presence of the mountain can be measured. Tests in front of (and in the lee of) hills in stronger winds are recommended.

The expedition described by Dr. Scorer provided a test of the method, and it is to be hoped that further experiments on these lines will be encouraged. Simple theory suggests that altimeter errors of about 200ft may occur over hills and it may well be that much greater errors occur in practice. An altimeter which indicates a clearance over mountain tops several hundred feet greater than the true clearance is a danger to the aircraft, and such altimeter errors must be fully investigated. A.H.Y

FOR TRIPLE THIRSTS

Details of an Important New Flight Refuelling Technique



The three Meteors on the right are refuelling from a Boeing KB-29 tanker of the U.S.A.F., at the wing-tips of which are the fairings for the flight-refuelling "packs". Presumably the KB-29 depicted is that referred to by Sir Alan Cobham as "the only three-point tanker in existence." Meteors' tanks are filled in 3 mins.

ON his recent return from America, Sir Alan Cobham, chairman of Flight Refuelling, Ltd., stated: "The only three-point tanker in existence at the moment is in the United States. The Americans are pressing forward full speed with probe-and-drogue refuelling. American aircraft designers are turning to flight refuelling as the only immediate answer to the demand for higher speed and longer range. The multi-point tanker has convinced them that probe-and-drogue refuelling can overcome many design problems with jet aircraft. The same system can be used with complete interchangeability by all aircraft, whether R.A.F., U.S.A.F., or civil."

Sir Alan went on to state that the tanker equipment could be designed as a "pack" installation which could be slung in the bomb bay or bolted on as a "pod." Given the right engineering approach, a bomber could be converted into a tanker in half an hour, and this had actually been done in the U.S.A. The big advantage of flight refuelling, he asserted, was economy of aircraft. Counting in the tankers, fewer—not more—aircraft were required when flight refuelling was employed, and studies showed that a combined force of a hundred flight-refuelled bombers and tankers could do the job of 200 unrefuelled bombers.

As for fighters, it is claimed that four tankers could refuel a squadron of twelve in three minutes at any height up to 25,000ft—and higher still with more powerful tankers than the present Boeing KB-29, as illustrated in the accompanying pictures.

Though it has been an open secret in this country for many months, the "multi-point tanker" has only recently been officially announced, and a fine film in colour depicting it in operation was shown in London last week.

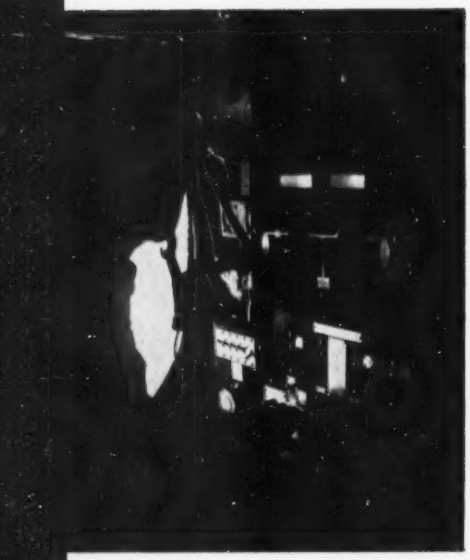
Discussing points arising from the film, Sir Alan Cobham said that the aim should be to have what he called "hermaphrodite" aircraft which, as they stood or with the minimum of attention, could be fitted to give or receive fuel. All military aircraft from the design-stage should be prepared to refuel in flight. A probe attachment-point was all that was required; the probe itself—weighing, say, a maximum of 25 lb—could be fitted in a few minutes when likely to be required.

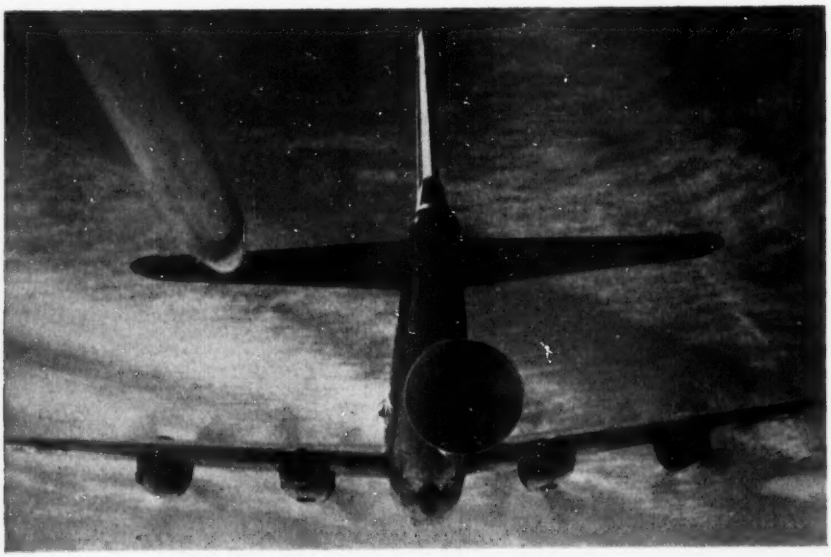
The triple refuelling points on the KB-29 tanker made no appreciable difference to the performance or handling of the aircraft. The drag of each hose was approximately 500 lb, and with the three trailing on the KB-29 the reduction in speed of the aircraft was only 5 to 6 m.p.h. Sir Alan thought that the present rate of transfer of fuel was adequate. If fuel were passed more quickly it might even lead to c.g. accommodation problems for the receivers.

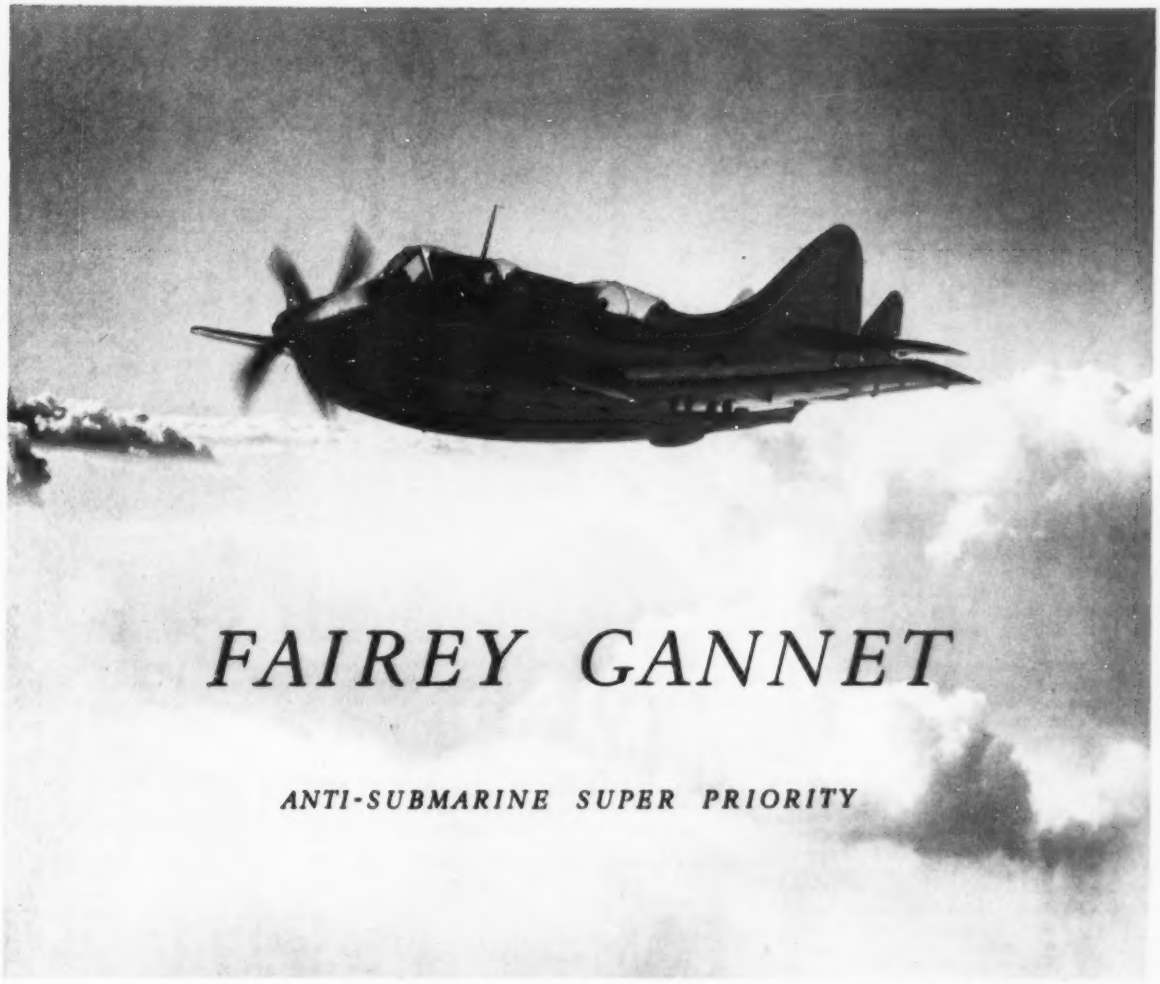
There had been no trouble to date with icing of probe or drogue, but trials on the ground with artificially iced probes had shown that icing could be overcome with a simple alcohol system.

The economic minimum with safe reserve for a tanker fleet for civil use from an airport such as Gander or Shannon was five machines, but to occupy this fleet on at least two refuellings a day would require the co-operation of more than one airline company. Clearly, Sir Alan thought there was everything in favour of such an arrangement from the payload and/or range point of view. He did not regard weather as a problem: a tanker could be fitted with adequate aids; the pilot would be completely familiar with the approaches and ground equipment at his base airfield, and could safely operate in poor conditions; the transfer itself by night or day would take place at over 20,000ft, and one could always find clear weather at this sort of height, within a reasonable distance of the transfer point.

At lower left is the operator's position in a Boeing KB-29 three-point tanker. This position is located by the starboard fire-control blister. Below: Slowly overtaking the KB-29 at about 5 m.p.h., is a fighter, the boom of which is visible at the top left-hand corner of the picture about to make connection.







FAIREY GANNET

ANTI-SUBMARINE SUPER PRIORITY

..."Anti-submarine weapons, both shipborne and airborne, far more effective than anything known during the last war, are becoming available, and arrangements have been made to enable heavier and faster types of naval aircraft to be handled in, and operated from, our fleet carriers."

Extract from the Statement by the First Lord of the Admiralty explanatory of the NAVY ESTIMATES, 1953/54.

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AIRCRAFT INTELLIGENCE

EGG-BEATER: Seen here during its first public demonstration in Connecticut recently, the Kaman HOK-1 is referred to on this page. The tail is not asymmetric; it is carried on two booms, one on each side of the fuselage. Kaman, incidentally, is pronounced as "command" without the d.

Great Britain

Avro Vulcan. David Anderton, an American writer, has said "The (Vulcan's) cockpit arrangement warrants close attention. Its side is marked with the usual triangle signifying an ejection seat, but there doesn't seem to be any jettisonable portion of the hood. There is a line of demarcation about one foot away from the intersection of cockpit and fuselage lines. That clue, plus the similarity of the nose cockpit sections on the Valiant and Vulcan, hint the use of a standardized jettisonable capsule for escape, rather than individual seats."

Bristol H.66. An American report states that the Bristol Aeroplane Company has a 45-passenger jet helicopter on the drawing board with the above designation. The H.66 will have stub wings and feature two turbojets plus ramjets on the rotor tips. From Bristol comes the comment: "No comment."

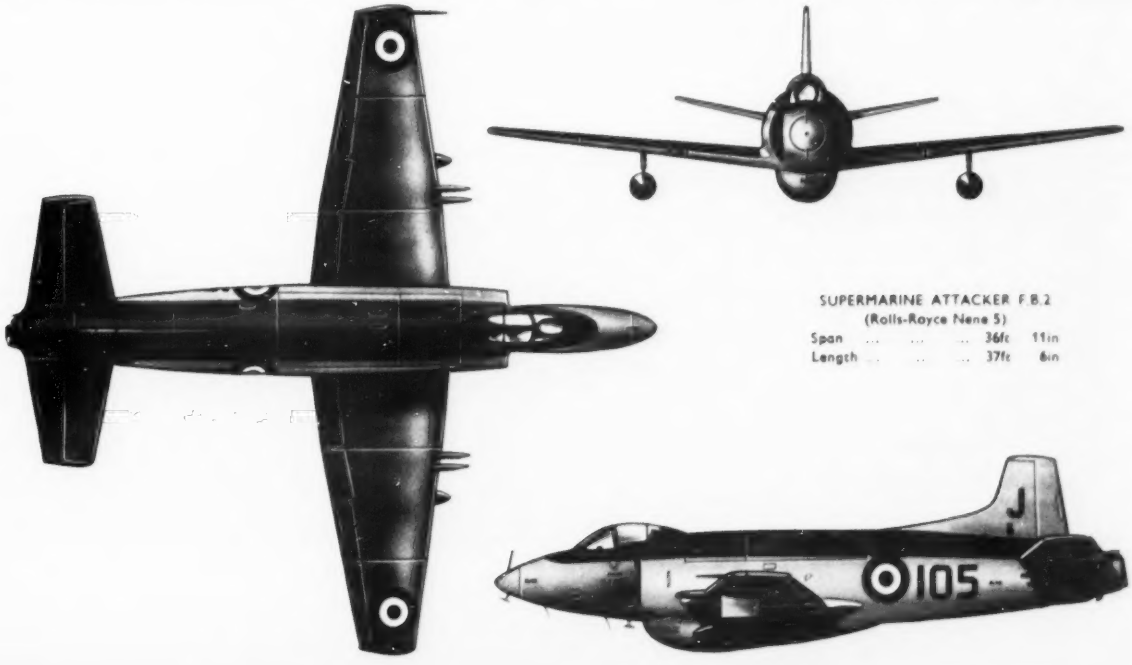
Vickers V.C.7. Contrary to an American report that the designation "V.C.7" was to be dropped to avoid confusion with the Boeing 707, we can state that the civil version of the Vickers jet transport will continue to be known by this title. The military aircraft remains "Type 1,000" for the time being.

United States

Kaman HOK-1. Shown on this page, the first HOK-1 observation and ambulance helicopter has now been delivered to the U.S. Navy. Considerably larger and heavier than former Kaman types, the HOK has two tail booms carrying fixed fins and tailplane and movable elevators to allow wide c.g. limits. Powered by a Continental R975 radial of 450 h.p., the HOK can carry two stretcher patients plus attendant and pilot. The engine is mounted at the rear of the bulky fuselage and drives the two intermeshing 48ft rotors through a gearbox and two uptake shafts; the engine is covered by clamshell inspection doors as in the Sikorsky S-55.

Martin B-57A Canberra. Apparently, according to *Aviation Week*, "British reports that the first U.S.-built Canberra has flown are wrong. The first Martin Canberra is now scheduled to make its first flight late this summer." Some, or all, of these aircraft will have a crew of two (British Canberra has a crew of three) seated in tandem beneath a long canopy. An English-Electric-built aircraft which has been at Baltimore over a year, has been modified to this configuration.

Turbine Transports. The journal *American Aviation* has published the following data regarding forthcoming American transport aircraft: Convair R3Y, flying boat seating 150/175, four T40 turboprops, all-up weight 150,000 lb, cruising speed 350 m.p.h., to fly late this year; Lockheed C-130A, Air Force transport, four T56 turboprops, to carry cargo, all-up weight 133,000 lb, cruising speed 390 m.p.h., to fly late this year; Boeing 707 tanker/transport, four podded J57 turbojets, 60/80 seats, 150,000/175,000 lb all-up weight, cruising speed 530/550 m.p.h., to fly July 1954 and be in service mid-1956; Lockheed L-193, four (?) J57 or Olympus turbojets submerged in the rear fuselage, 100/120 seats, 200,000 lb. all-up weight, cruising speed, 550/600 m.p.h., no dates given; Douglas DC-8, four J57 or Olympus podded turbojets, 68/100 seats, 200,000 lb all-up weight, cruising speed 550/600 m.p.h., to fly 1957 and be in service 1958. In passing, we might mention that the model jet airliner studied by United Air Lines (*Flight*, April 10 last, p. 468) is believed to approximate to the DC-8. This project is stated to have tankage for 15,000 U.S. gallons of fuel, which would weigh more than half the quoted all-up weight. The payload is given as 20,000 lb.



SUPERMARINE ATTACKER F.B.2
(Rolls-Royce Nene 5)

Span	36ft	11in
Length	37ft	6in

"FLIGHT"
photographs

At a late stage in the Merryfield course the pupils learn the art of jet-aircraft formation flying, a vital aspect of Fighter Command operational procedure.

(Below) A study in expressions: Key personnel at R.A.F. station, Merryfield. (Left to right) S/L. C. F. Babbage, W/C. L. T. G. Barber, G/C. P. B. Wood, S/L. K. Lister. The posts they occupy are named in Column 1 below.

JET TRAINING IN PI

WITH THE DUAL VAMPIRES AT MERRYFIELD · IMPRESSIONS ON

IN our issue of May 8th we described the modifications which are being made to the de Havilland Vampire T.11 side-by-side trainer before it enters service in large numbers. A number of unmodified aircraft are, however, already in operation at the Advanced Flying Schools at Merryfield and Valley, and recently we were given an opportunity of visiting the former station in order to see for ourselves how the new trainer was working out in practice.

Merryfield is pleasantly set in rural surroundings not far from Taunton, and the accommodation, though hutted, is modern and comfortable. Commanding the station is G/C. P. B. Wood, who has W/C. F. J. Seabrook, O.B.E., as Chief Technical Officer and W/C. L. T. G. Barber, O.B.E., A.F.C., as Wing Commander Flying. The unit is No. 208 A.F.S., which is divided into two squadrons—No. 1, commanded by S/L. C. F. Babbage, D.F.M., and No. 2 by S/L. K. Lister, D.F.C. The former unit is still equipped with Meteor 7s for dual instruction, but the latter has already received its full complement of T.11s.

The general intake arrangements are that a new course comes in once a fortnight, the odd-numbered courses going to No. 1 Squadron and the even to No. 2. When a pilot arrives he will have done about 200 hours' flying, plus a few more on a short acclimatization course if he has been trained in Canada or Rhodesia. At the A.F.S. he will get another 50-60 hours, all of which is pure conversion training; it must be stressed that an A.F.S. is not an Operational Conversion Unit, which is the next stage for the successful pilot. The courses last 14 weeks, in the first two of which the work is purely ground training. During the rest of the time flying is the thing, and the remaining ground lectures and demonstrations are laid on as and when convenient to fit in with weather and serviceability.

The ground training facilities, although following standard practice, seem unusually good. In the demonstration room are sectional or Perspex-mounted working models of Goblin and Derwent engines, numerous gyro instruments, the Sperry G4B compass and Goblin starting equipment. Board-type models show the hydraulic, pneumatic and fuel systems of the Vampire, and at one end of the room is a complete cockpit in which the various hydraulic and electrical systems can be operated, thus enabling preliminary cockpit drills to be carried out without grounding an aircraft. An unusual touch is that a half-wing is mounted vertically beside the cockpit, thereby saving space and at the same time permitting pupils to watch the undercarriage, flaps and air-brakes as they move.

Other features of the ground school are the well-arranged aircraft recognition room—particularly important now that the subject no longer forms a part of earlier courses—and the instructional cinema, where considerable ingenuity has been shown. In charge of all ground work is the C.G.I., S/L. W. J. T. Henderson.

Turning now to the flying side, pupils start their training with a familiarization flight, and then move on to circuits and landings and all the more obvious exercises which must be done before solo. Time to first solo normally varies between three and five hours; no hard-and-fast rule is laid down about the maximum dual-time permitted before a pilot is taken off the course, such failures as there are—and the numbers are decreasing—being treated as individual cases. Sorties are usually of 40 minutes' duration, and the successful pilot will carry out roughly equal periods of dual and solo flying during his stay. The accent, of course, is on high-speed, high-altitude flying. The T.11 will climb to well over 40,000ft (at which altitude cabin pressure is equivalent to about 25,000ft), and has a critical Mach number of about 0.82. This latter compares with much the same figure for the Meteor 7, and 0.78 for the Mk 9 Vampires which are used for solo. Approach to critical speed is heralded by hardening of the controls, buffeting and porpoising; and, if the pilot perseveres, a rather violent nosing-up usually follows. Throttling back or application of air-brakes restores matters to normal almost immediately. The pupils are fully instructed in Mach effects at heights of the order of 30,000ft, and operate regularly up to 40,000ft. For aerobatics, 20,000ft is considered an ideal altitude. Emphasis here is on continuous or series

manœuvres, rather than on just "doing an aerobatic" and then taking a deep breath before trying another. This system is regarded as most important, particularly in forming a basis for grading the young pilots.

There are many other important exercises in the course. Formation flying, for example, must be tackled under jet conditions. Cross-countries must be done, one with a landing at a half-way point in Northern England. Low flying is important, including low-level circuits and cross-countries; this last a tricky business indeed, depending much on good pre-flight planning. And then there is instrument flying—that absolute essential of modern training.

When they arrive, the pupils have a white-card rating on Harvards, Oxfords or Balliols. Before they leave, they must obtain this rating on jet aircraft. It is not easy to devise a really "cheat-proof" system of instrument flying for a side-by-side trainer like the T.11, and as much actual cloud-flying as possible is done. Limited panel-work is naturally a feature, and controlled descents are a most important part of the syllabus; the unit teaches two different systems: one is the universal type, involving a rate of descent of between 3,000 and 4,000ft/min from any altitude above 10,000ft; the other is a special A.F.S. descent at 6,000ft/min from 12,000ft. The T.11 comes down nicely at such a rate with air-brakes out and 6,500 r.p.m. on the counter, at an I.A.S. of approximately 250 kt.

Misting-up on reaching lower levels is sometimes a problem. The T.11, unlike the Meteor 7, has no electrical heating element in the windscreen, and must depend solely on the cockpit heating to combat misting. This is usually sufficient, but occasions have arisen when aircraft have had to bat around blind at high speed under ground control to "burn off" the troublesome condensation. The Vampire 9, with its smaller cockpit and windshield, is better off in this respect than the T.11. The trouble could be cured, or at least greatly alleviated, by rearranging the cockpit hot-air ducts—

RACTICE

SOME SAMPLE CIRCUITS

"Just hold her off as long as you can"—but "Flight's" representative, pupil on sample circuits, appears to be paying less attention than he should to F/O. Sewell's demonstration landing.

Another striking impression —this time over typical West Country coastal scenery—of three Merryfield Vampire T.11s in close company.

Ground Familiarization: An instructor explains the Vampire cockpit to a pupil pilot before their first flight together.

JET TRAINING IN PRACTICE . . .

and this may possibly be done on later aircraft. Both the T.11 and the Mk 9 are fitted with a Godfrey cold-air unit which takes care of all cockpit pressurization, heating and refrigeration. The unit has proved extremely effective, the improvement on the system in the Mk 5 being notable.

All the gyro-operated flight instruments are electrically driven. Current is normally supplied by a single generator, which has proved unusually reliable, but in the event of generator failure the instruments (and various other services) must run on the battery. A special high-capacity (40 amp/hr) unit is standardized with this emergency in mind. The reliability of the generator, and the capacity of the battery are together considered sufficient insurance against gyro failure, and, if the engine cuts, no generator will function anyway; this is why no reserve generator is fitted. There is a drive on the Goblin which could operate such a reserve, but considerable modification would be necessary before space could be found in which to install it.

Range and endurance for the T.11 are similar to that of the Mk 9. The Mk 1 carried 202 gallons, and 40 minutes was looked upon as the maximum safe endurance. The T.11 and Mk 9 each hold 330 gallons, giving a corresponding endurance of up to two hours : the great increase is due to the fact that all the extra fuel can be used at height, where the Goblin is relatively economical. If two 100-gallon wing-tanks are fitted, endurance rises to 3½ hours.

For communication with ground control, all the Vampires at Merryfield are fitted with two V.H.F. sets, the TR.1934 and the TR.1935. The second is of but moderate assistance, only the naval rescue frequency among those available being of any value. Pilots feel it would be better if two TR.1934s were installed. Air Traffic Control at the station is fortunate in being equipped with one of the newest C.R. D/F. units, and this is proving a great boon. To the unfamiliar observer, it was fascinating to look at the dusky, circular surface of the display tube and see, the moment an aircraft called up, a thin green line leap out from the centre and unerringly indicate the QDM which the pilot should steer to reach home.

Shortly afterwards the writer was lucky enough to be allowed to try out some circuits from the left-hand seat of a T.11. After donning mae west and parachute-cum-dinghy, I struggled up the narrow ladder and lowered myself rather gingerly through the opening in the roof. Once inside there was a surprising amount of room, and a glance around the cockpit showed that all the controls and instruments were disposed in a very agreeable manner. Soon my instructor, F/O. W. K. Sewell, joined me, and a few minutes later the Goblin was screaming away contentedly behind our backs as we taxied along the perimeter track. Taxying proved extremely easy : you just set suitable idling revs (about 4,500), work the control-column brake lever with your right hand, and obtain the necessary differential action with the rudder pedals. View is almost perfect in every direction.

Lined up on the runway, I opened the throttle, gently at first to avoid, among other things, harmful engine-resonance, then more rapidly. The rev-counter needle fairly danced round its dial, like a clock gone mad, and there was a satisfying pressure on our backs as the thrust began to take effect. Soon 10,750 r.p.m. were registering, naturally without any signs of swing, and at 90 kt I eased the nosewheel off the ground. A few seconds later the aircraft sailed eagerly into its natural element at 110 kt. The undercarriage came up quickly enough, and then we were climbing at 9,700 r.p.m. at 170 kt, round on to the downwind leg. At 1,000ft we levelled off and throttled back to 6,400 r.p.m., still at 170 kt, thus providing time to carry out the relatively simple cockpit checks and notify Control of our whereabouts with a brief "downwind."

I found that my speed had crept up a little over the permissible 175 kt for undercarriage lowering so the dive-brakes were whipped down for ten seconds or so, providing the necessary retardation without noticeable change of trim. Then down with the undercarriage, on came the green lights, and we started the turn in as soon as the port wing-tip was in line with the end of runway. Speed was allowed to drop off to just under 145 kt, and full flap was selected.

Then came the one tricky part in flying a Vampire round the circuit. The flaps come down rather slowly, initially giving little change in trim, then finally producing a most pronounced nose-up effect. Warned of this, I thrust the stick (as I thought) well forward; but it was not enough, and I soon found myself gaining height at an air speed of only 110 kt. Corrective action with trimmer, stick and throttle soon righted matters, and the final approach was then continued.

There was a strong, gusty wind, causing about 10 deg of drift on the approach at 120 kt, but it seemed to have very little effect on the problem of arriving on the ground. The hedge was crossed at between 95 and 100 kt, the throttle pulled right back, and the aircraft allowed to float along the runway with increasing back pressure on the stick until the mainwheels touched. The idea then is to hold the nose in the air, as with any tricycle aircraft, but this requires much more effort in the T.11 than it does in a single-seater Vampire, and our nosewheel was very soon on the ground. There was no discernible tendency to weathercock into the wind, and the brakes provided very adequate stopping power.

During subsequent circuits we tried out "shoot landings," which save so much time when instructing. Provided you remember to open up the engine slowly at first, there is no difficulty over these at all—though surprising strength must be exerted to get the nose-wheel back into the air once speed has dropped again. Another interesting item was a low-level circuit at 300ft. Here the change in trim with flaps was particularly noticeable, as was the delay in gathering speed when the jet was opened up, in contrast to the results under similar circumstances in a piston-engined aircraft. One could readily appreciate the skill required of Naval pilots in landing jet aircraft on carriers.

So ended a most interesting trip, and one which convinced me that the jump from Provost to Vampire Trainer in the future will provide no insuperable difficulties for would-be pilots. The T.11 may be a little more tricky than the Harvard on the approach, but in all other respects, notably in take-off and landing characteristics, it appears to be a much easier aircraft to handle. Maintenance difficulties exist at the moment, owing to lack of spares for this aircraft (which pilots and technicians alike claim is not "just another Vampire," but an individual though related machine); but this problem will not exist for long, and the aircraft is extremely easy to service once the spares are available. D.I.C.

Javelin
twin Sapphire fighter

Britain's first operational delta-winged aircraft the Gloster Javelin is powered by two Armstrong Siddeley Sapphire turbojets, the engines which are destined to be of the greatest strategic importance in the equipment of Western air forces

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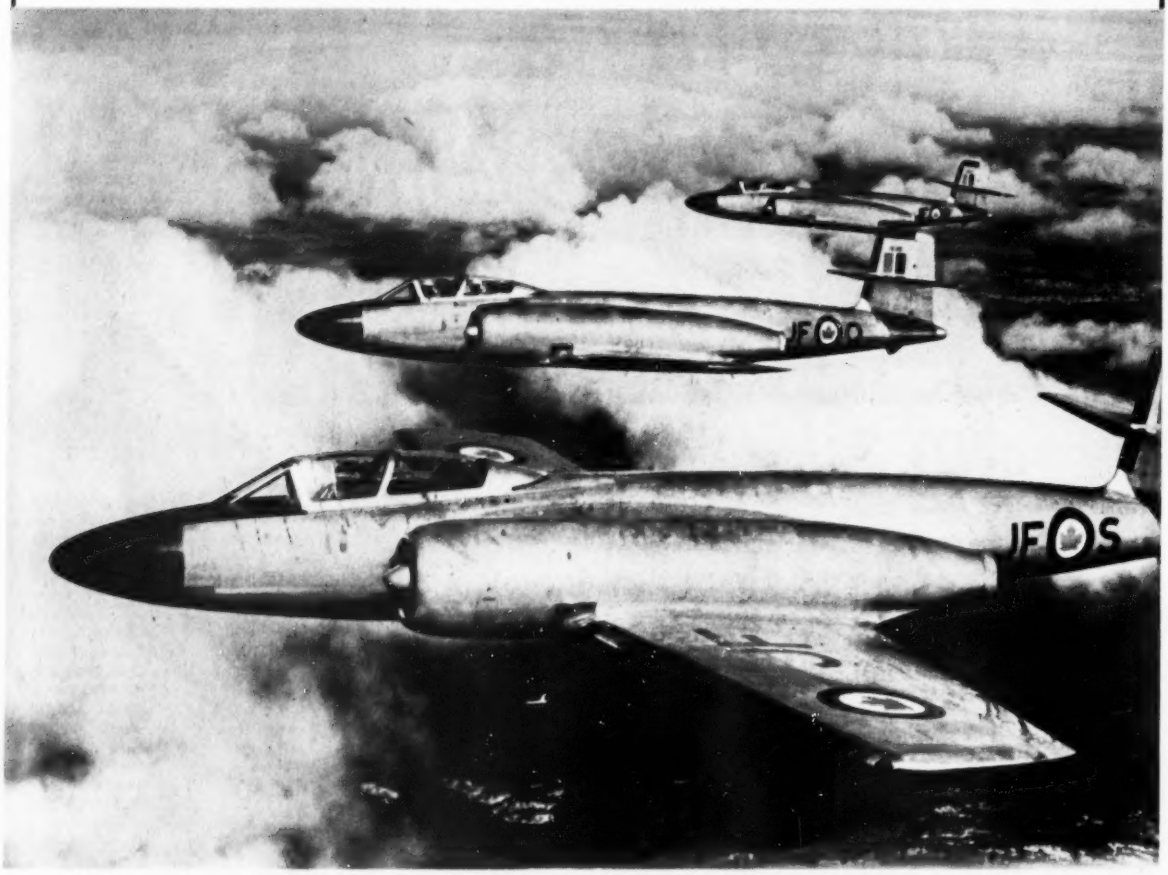

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COSTING THE JET AIRLINER

The American Approach: Boeing Executive's S.A.E. Lecture

AMERICA'S airlines have lately shown increasing concern over the steady rise in capital cost of new equipment. It is already apparent that relatively low cost, as offered by new British airliners, will be a major factor influencing U.S. operators' choice between replacements for the Stratocruisers, DC-6s and DC-7s and Super Constellations now in service or about to enter service.

In a letter entitled *Factors Influencing Airplane Costs*, delivered before the recent S.A.E. National Aeronautics Meeting in New York, Mr. J. W. Barton, of the Boeing Airplane Company, contended that a 186,000 lb jet airliner could be sold for $4.56m—provided sufficient orders were placed. Even so, this figure is high compared with $1.6m for the 122,000 lb DC-7. The paper, which is summarized below, emphasizes the importance of modern development and production methods and maximum standardization of the finished product as means of keeping the capital cost within reasonable limits.

The speaker spent the first part of his paper in reviewing the basic factors and trends influencing aircraft costs and the industry's efforts to reduce these costs. Of particular interest in the early stages of Mr. Barton's exposition was his demonstration that the Comet 3, currently selling for $2.1m, would have to sell at $3.1m if subjected to U.S. labour and material costs.

Continuing, the lecturer said that in addition to airliner cost experience, manufacturers had already accumulated a considerable experience in building military jet aircraft. In almost every case the B-47 engineering and design staff man-hours were at least twice as great as those for the B-29 staff—and the B-47 was considered to have been conceived at minimum cost.

The number of electrical systems in the B-47 increased 55 per cent over those in the B-29; vacuum tubes increased by 333 per cent and weight of the electronic equipment by 371 per cent. The B-47/B-29 comparison was not exactly parallel to the commercial transport, but a substantial increase in electronic equipment would be needed.

There were certain other relationships with which industry was familiar. Flat 0.06in sheet in relatively small sections was used for the Stratocruiser, but machine-tapered skins as thick as 0.4in were required for "Jet 1". These skins were so large that they had to be handled by overhead equipment. Stringers for the Stratocruiser were of sheet metal and a constant thickness of 0.125in; they were piloted in the fabrication operation and were short enough to be man-handled. The stringers for "Jet 1" would be made from extruded sections with half-inch thicknesses machine-tapered full length and long and heavy enough again to require mechanical handling. Rivets were heavier, and many high shear rivets and lock bolts would be used for structural efficiency on Jet 1. A Class 2 (0.014in tolerance) hole, which required little inspection, was used for the Boeing Stratocruiser, but for "Jet 1" a Class 1 hole would be used, requiring precision inspection of every hole and countersink. For the Stratocruiser (Model 377) a standard quarter-inch electric drill plus a half-inch air motor and relatively few drill bushings were required. For "Jet 1", because of material thickness and hole tolerance, automatic air feed drills were required. A drill cage to position the drill and locate the hole must be built, and a handling sling must be provided to move the drill cage in and out of position. The final assembly jig of Jet 1 would cost nearly ten times that for the Stratocruiser.

They also knew a little of power-plant cost for a new jet airliner. For the Model 377 the cost of engines and airscrews plotted was $3.50 per empty pound of aircraft weight. For a jet liner, recent quotations indicated that they should expect to spend $460,000 on engines. For an 86,000 lb empty weight this would mean $5.35 per lb empty weight—a substantial increase.

Normal estimating techniques, continued Mr. Barton, were consistent among all aircraft manufacturers; they started out assuming a programme in terms of a number of aircraft to be built at a given rate per month, and conforming to a certain description. Engineering, tooling and production philosophies were discussed and established by management. The estimators then draw upon their experience in terms of dollars per pound of material and man-hours per pound for labour; engineering man-hours and tooling man-hours were generally estimated on the basis of the known statement of work in comparison with previous airplane contracts. If possible, bids were obtained from the principal suppliers. Labour and overhead rates were selected for the period of construction and multiplied by the man-hours. All these items were then totalled, profit was added and there you had an estimate; a great deal of judgment was involved.

If one assumed "Jet 1" was to weigh about 186,000 lb and have a block speed of 460 m.p.h., one multiplied two factors and found the point of intersection with the projected trend line. (Boeing 247 . . . Boeing Stratoliner . . . Boeing Stratocruiser . . . "Jet 1"). This method indicated the price of $24.50 per lb of gross weight which, when multiplied by 186,000 lb, yielded a total unit price of $4.56m for 75 aircraft.

The lecturer then presented a summary of the industry's efforts to ensure production at the lowest practicable cost.

Wind-tunnel, flight-test and structural development programmes had been greatly increased to ensure that a design would not progress too far before its soundness was proved. When a model left the preliminary design stage and was established in a project for detail engineering, cost analyses of particular designs were employed where the economics of one alternative were not self-apparent.

Planning of all descriptions seemed to be the most logical answer to decrease recurring and non-recurring costs. All personnel and equipment moves within the plant were carefully planned in advance to minimize loss of working time. Layouts were checked by models of equipment and workmen. Production and tool planning was carefully administered within established policies to ensure the best schedule and cost performance possible. Each of from 40,000 to 80,000 parts required on a modern jet aircraft were carefully scheduled by economic lot sizes into outside and inside procurement channels. Assembly and installation sequences for major assemblies and installations were determined by careful method study and analysis.

As soon as the first few units had been completed on the pre-planned basis all major assembly and installation operations were subjected to direct time study. Work positions, sequences and man-hour targets were re-established accordingly. Sub-contractors were monitored by various methods to ensure on-schedule and low-cost performance. Contracts provided financial incentives for good performance.

New quality-control and inspection procedures were continuously sought to improve the efficiency inspection and to correct causes of parts rejection. Training programmes were employed to increase skills at all levels.

A direct reward was offered to all members of management for their contribution towards increased profit; this was a strong incentive to reduce costs. In 1952 Boeing employee's suggestion system accepted 1,438 ideas, which after deducting the cash awards made, yielded estimated savings to the company and its customers of $1,166,000. Manufacturers should continue their efforts toward cost reduction in design and construction.

The airlines and the manufacturers should strive to minimize changes from the basic design. At present they could be caused through interpretations of C.A.A. and C.A.R. regulations or possible modifications resulting from operating experiences; changes required by the customer involving instrumentation, equipment and interior arrangements.

"Customer changes" were extremely difficult to control. While the airlines all talked of standardization, they seldom practised it. It was extremely difficult to price a change. While it was possible to evaluate the bits and pieces, it was almost impossible to evaluate the disrupting influence of a change and the effect it had on the cost of the basic article as reflected on the learning curve. While, cost-wise, changes *from the basic* specification were bad, changes *between customer's* specifications were disastrous. Total costs in the first instance might be expected to decrease from unit to unit on about an 85 per cent curve (slope on log-log paper). Customer-to-customer changes might quickly make this improvement rate 90 per cent. For 75 aircraft this would *increase the total costs by 30 per cent!*

Nearly one-third of the Boeing Company's total loss on the Stratocruiser project which involved six initial customers and 55 aircraft, was attributed to cost overrun on changes! On Project "X" Boeing was following S.A.E. recommendations wherever possible and hoped to use this lever to achieve more standardization.

In summary, Mr. Barton gave the following prescription, which, if taken seriously and continuously, would decrease sales prices dramatically: (1) Minimize changes from the basic specification; (2) eliminate all but the most minor variations between airplanes for different customers; (3) minimize the use of unproven equipment; (4) minimize luxury accommodations; (5) pool purchases of aircraft and spares; (6) order spares early enough to permit concurrent production with aircraft parts.

BRISTOLS FLY HIGH

"Flight" photograph
The Olympus-Canberra, in which W/C. W. F. Gibb established the new world's altitude record of 63,668ft (subject to confirmation), ascends to the upper air.

Background to the Olympus-Canberra's 63,668ft Record: Some New Facts

THE chronological list of world's "heavier-than-air" altitude records which we reproduce discloses that Great Britain has established five records out of 41, and all of these since the year 1931. Four, including the Olympus-Canberra record chronicled in last week's issue, have been set up with Bristol engines, and in two instances the airframes likewise have been of Bristol design and manufacture. Of earlier—foreign—records, two (those of Neuenhofen in 1929 and Donati in 1934) were accomplished with Bristol power units.

The work of the Bristol company in developing high-altitude aircraft engines dates from the building of the turbo-supercharged Jupiter in the early 1920s. The programme was, of course, under the direction of Sir Roy Fedden, and when he himself traced the history of supercharging in this country, he acknowledged the basic work of R.A.E. and other manufacturers.

It is 38 years since experimental investigations were made at the Royal Aircraft Factory (now the Royal Aircraft Establishment) into the characteristics of piston and displacement blowers; but these were quickly discarded in favour of the exhaust turbo. In charge of the turbo investigations was the late Mr. J. E. Ellor, and he worked in collaboration with Metropolitan-Vickers. A design had already been completed when it was learned that the Rateau concern in France was working along the same lines and was, in fact, further advanced than "The Factory." Accordingly, a Rateau supercharger was procured, fitted to an R.A.F.4D engine and flown in an R.E.8 during the autumn of 1918. This aircraft was also fitted with a four-blade v.p. airscrew, and stands as one of those almost forgotten "milestones" of development which occur from time to time in aviation history.

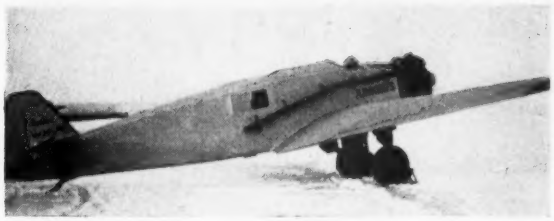
Soon after the 1914-18 war flight tests were put in hand with a British exhaust turbo in a Liberty-D.H.9A, and later in a Lion-engined 9A, the latter machine achieving a height of over 30,000ft in about 1920. During 1923 an experimental turbo supercharger designed and built by the R.A.E. was fitted to a Jupiter III engine, and was eventually installed in the original "Seely Supercharger" biplane—a special version of the F.2B Tourer built for the Air Ministry Civil Aeroplane Competition of 1920. In 1924 the Seely undertook a comprehensive flight-test programme which included climbs to 23,000ft. Later its supercharger was removed and installed on a Jupiter IV in a Bloodhound, and as a result of trials the Air Ministry asked the Bristol company to design a new high-altitude engine incorporating this type of blower as an integral feature. The resulting engine, named Orion, had the same bore and stroke as the Jupiter, but was entirely different in crankcase and cylinder design, which resulted in a slight reduction in overall diameter. Exhaust and induction systems were wholly redesigned and a special type of duplex carburetter was used. Owing to the great metallurgical difficulties encountered the Orion was not flight-tested until 1928, when it was fitted in a Gloster Gamecock airframe at Farnborough. The maximum power of 495 h.p. was maintained up to a height of over 20,000ft, which level was attained in less than 13 minutes. Also on test at the R.A.E. in the late 'twenties was the Gloster Guan, powered with a turbo-supercharged Napier Lion driving a Hele-Shaw-Beacham v.p. airscrew.

It must be emphasized that the installations named were of a purely experimental nature and, notwithstanding intensive development of the exhaust-turbo in America, this form of supercharger was allowed to lapse in this country until its reinstatement on the Napier Nomad. Instead, development resources were concentrated on the mechanically-driven blower, developed first in France and later—taking French designs as a basis—in this country. Sir Roy Fedden has paid further tribute to the R.A.E. for initiating design in Great Britain at the end of the Kaiser's war, and he has described the R.A.E. pattern as "a classic" which "laid the foundation for gear-driven superchargers all over the world." The initial Service application was that of the Jaguar IVS in the Siskin IIIA fighter—the first standard military aircraft to have a supercharged engine; but by no means all the R.A.F. Siskins had this "blown" Jaguar, and the first supercharged unit to be selected for large-series production was the Bristol Jupiter VII of 1927. This had a rated altitude of 12,000ft and was fitted as standard in the long-lived Bristol Bulldog.

Rich benefits accrued to British high-altitude fighting aircraft from the installation of progressively developed Bristol engines. Thus, the Gloster Mars VI, or Nighthawk, with unsupercharged Jupiter, attained a ceiling of 26,000ft in the early 1920s; the Hawker Hawfinch and Bristol Bulldog of the early 'thirties reached levels around 30,000ft with the supercharged Jupiter VII; the Mercury-powered Gloster Gauntlet of the mid-'thirties could climb to over 35,000ft; and the eight-gun Perseus-engined Bristol 146, built just before the Second World War, had a service ceiling of over 38,000ft.

It is a little-known fact that the second prototype Bulldog was modified for an attempt to exploit the ultimate high-altitude performance of the Jupiter

"Flight" photograph
The Olympus-Canberra arrives at London Airport for public inspection on the week-end following the announcement of W/C. Gibbs' new height record.



At upper left is the Bristol "Seely Supercharger" used during 1923 for testing an experimental turbo-supercharger fitted to a Jupiter III. Below is the Junkers W.34 (Jupiter VII) in which Neuenhofen attained 41,740ft in May 1929. Seen in side view is Uwins' Pegasus-engined Vickers Vespa (44,233ft in 1932). Heading this column is the Italian Caproni 113 (Alfa-Romeo-built Pegasus) in which Commendatore Renato Donati ascended to 47,360ft in 1934, and below it is the Bristol 138 flown by S/L. F. R. D. Swain to 50,236ft in 1936.

WORLD'S AEROPLANE ALTITUDE RECORDS

Year	Pilot	Country	Aircraft	Height (metres)	Height (ft)
1909	Hubert Latham	France	Antoinette	155	508½
,,	Comte de Lambert	France	Wright	300	990
,,	Hubert Latham	France	Antoinette	453	1,495
1910	Hubert Latham	France	Antoinette	1,000	3,300
,,	Louis Paulhan	France	Henry Farman	1,209	3,990
,,	Walter Brookins	U.S.A.	Wright	1,335	4,405
,,	Hubert Latham	France	Antoinette	1,384	4,567
,,	Walter Brookins	U.S.A.	Wright	1,900	6,270
,,	Armstrong Drexel	U.S.A.	Blériot	2,012	6,640
,,	Leon Morane	France	Blériot	2,582	8,521
,,	George Chavez	France	Blériot	2,587	8,537
,,	H. Wynmalen	Holland	Henry Farman	2,780	9,174*
,,	Armstrong Drexel	U.S.A.	Blériot	2,880	9,504
,,	Ralph Johnstone	U.S.A.	Wright	2,960	9,768
,,	George Legagneux	France	Blériot	3,100	10,230
1911	M. Loridan	France	Henry Farman	3,177	10,484
,,	Capt. Félix	France	Blériot	3,190	10,527
,,	Roland Garros	France	Blériot	3,910	12,903
1912	Roland Garros	France	Blériot	4,900	16,170
,,	Georges Legagneux	France	Morane	5,450	17,985
,,	Roland Garros	France	Morane	5,610	18,513
1913	M. Perreyon	France	Blériot	5,880	19,404
,,	George Legagneux	France	Nieuport	6,120	20,196
1920	Major R. W. Shroeder	U.S.A.	Lepère	10,093	33,307
1921	Lt. J. A. MacReady	U.S.A.	Lepère	10,518	34,709
1923	Sadi Lecointe	France	Nieuport Delage	10,742	35,449
,,	Sadi Lecointe	France	Nieuport Delage	11,145	36,778
1927	Lt. C. C. Champion	U.S.A.	Wright Apache	11,710	38,423
1929	Lt. Apollo Soucek	U.S.A.	Wright Apache	11,930	39,369
,,	Willi Neuenhofen	Germany	Junkers W.33 (Jupiter)	12,739	39,839
1930	Lt. Apollo Soucek	U.S.A.	Wright Apache	13,157	43,418
1932	Cyril F. Uwins	G.B.	Vickers Vespa (Pegasus)	13,404	44,233
1933	Georges Lemoine	France	Potez 50	13,661	45,081
1934	Comm. Renato Donati	Italy	Caproni (Pegasus)	14,433	47,360
1936	Georges Detré	France	Potez	14,843	48,982
,,	S/L. F. R. D. Swain	G.B.	Bristol 138 (Pegasus)	15,223	50,236
1937	Lt.-Col. Mario Pezzi	Italy	Caproni 161	15,655	51,661
,,	F/L. M. J. Adam	G.B.	Bristol 138 (Pegasus)	16,440	54,252
1938	Lt.-Col. Mario Pezzi	Italy	Caproni 161	17,083	56,374
1948	G/C. J. Cunningham, D.S.O., D.F.C.	G.B.	Long-span D.H. Vampire	18,119	59,446
1953	W/C. W. F. Gibb, D.S.O., D.F.C.	G.B.	English Electric Olympus-Canberra	19,410	63,668

**Originally credited to France.*

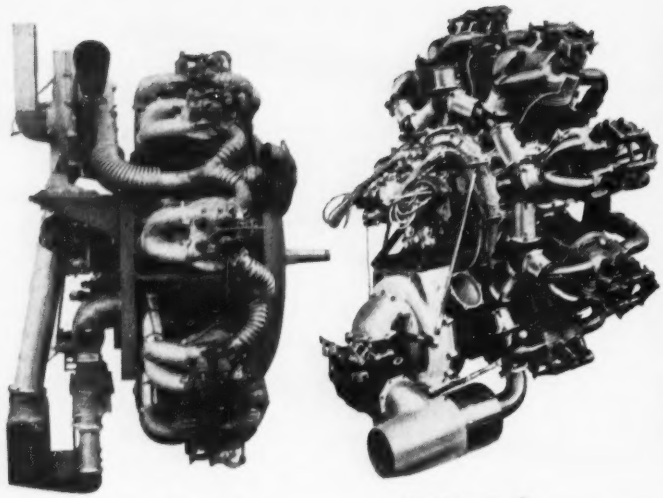
VII. In October 1927, wings of greatly increased span and area were fitted, together with a special cockpit heating and oxygen installation. The High-Altitude Bulldog, as it was known, was flown for the first time by Mr. C. F. Uwins, the present managing director of the aircraft division of the Bristol company, on November 7, 1927, and was then sent to the R.A.E. for tests with F/L. J. A. Gray as pilot. It was hoped that an absolute ceiling of nearly 40,000ft would be attainable, but some doubt as to the strength of the new wings in a t.v. dive, and the establishment of an unofficial record of 38,000ft by Donati in December of that year, caused plans for a record attempt to be abandoned.

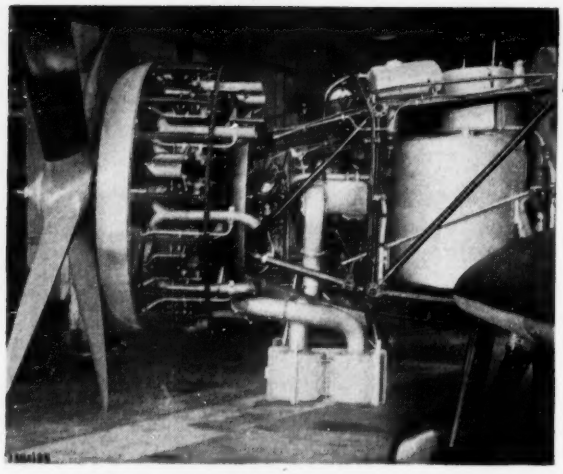
During 1931/33 the Bristol company was engaged on the development of the Phoenix compression ignition engine, which was basically of Pegasus design, and after several months' development-testing an Air Ministry special-category test was completed and the Phoenix I was cleared for flight in a Westland Wapiti. Soon after the R.A.F. Display in June 1933, the engine was converted to a supercharged type—the 485 h.p. Phoenix II—and this gave extremely satisfactory results, although no attempt was made to raise power by use of excessive explosion pressures or special grades of fuel. The engine was re-installed in the Wapiti in March 1934, and flight tests showed that the Phoenix II maintained its power at height a great deal better than an equivalent petrol engine. It was therefore decided to ascertain the absolute ceiling under officially observed conditions, and on May 14, 1934, Mr. Harold Penrose, chief test pilot to the Westland company, took the Phoenix-Wapiti to 27,453ft. This was duly homologated as a world altitude record for C.I.-engined aircraft, and has remained unbeaten to this day.

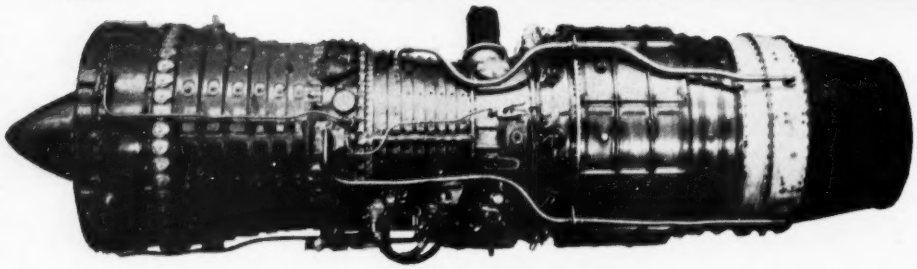
It is also noteworthy that the Pegasus-engined Westland Wallace and Houston-Westland aircraft used by the Houston Mount Everest Expedition in 1933 achieved 34,000ft and over 35,000ft respectively with their full load.

After the single-speed mechanically-driven blower, the next major advance was the two-speed type, first developed in France and later—using French designs as a basis—in this country. Then came two-stage supercharging, and it was the two-stage Bristol Pegasus which enabled Swain (1936) and Adam (1937) to achieve their records with the Bristol 138 and 138A respectively. In the special Pegasus used the blower drive incorporated clutches so that the engine could be used as a naturally aspirated unit up to a certain height. The second stage was brought in at 35,000ft.

Although the mighty Olympus turbojet which enabled W/C. Gibb to set the new record bears no physical relationship to the historic supercharged piston engines to which we have alluded, it is not without significance that it is, in effect, a supercharged unit itself. It consists essentially of a low-pressure and high-







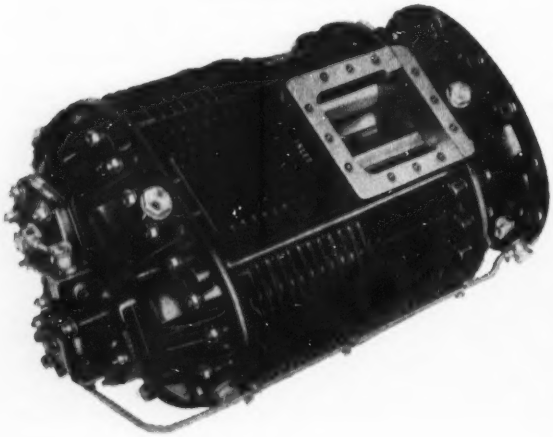
From left to right (top) are an early Jupiter with turbo-supercharger (1922); the Orion, likewise turbo-supercharged, built in 1926 and flown in a Gloster Gamecock; and the Pegasus PE VI S which powered the Bristol Type 138 in two successful attempts on the world altitude record. Right, the "two-spool" Olympus.

BRISTOLS FLY HIGH . . .

pressure unit, each having an entirely independent axial-compressor and turbine, the low-pressure unit serving to supercharge the high-pressure compressor. As was remarked last week, the maintenance of a sufficient air supply to a turbo-jet at extreme altitude is one of the great problems now confronting designers. In this connection the Bristol company have disclosed that the Olympus needs three tons of air a minute—i.e. it would completely exhaust a living-room of air in half a second.

From the original "two-spool" concept by Mr. F. M. Owner, C.B.E., in 1947, the Olympus was designed and brought to its present standard under the supervision of Dr. S. G. Hooker, O.B.E., who was appointed chief engineer of the Bristol company's engine division in 1951. The first intimation of the Olympus's power was given in 1952, when the static thrust was quoted as 9,750 lb; but it may be presumed that substantially greater outputs are being achieved today. In the record-breaking Canberra, it may be noted, the full power could not in any case be developed because of the restriction on jet-pipe diameter imposed by the wing-spar structure—a restriction which will not, of course, be applicable in the case of the Avro Vulcan, production versions of which will be powered with four Olympus.

A Godfrey two-stage cabin supercharger (Type 5/50/25) of the type which pressurized the cockpit of the Olympus-Canberra and supplied warm air for heating.



As for the record-breaking English Electric Canberra airframe, we can do no better than print this acknowledgment by the Bristol company: "The achievement of so vast a height with a normal aircraft is a tribute no less to the designers and builders of the machine than to the Olympus engines which made it possible."

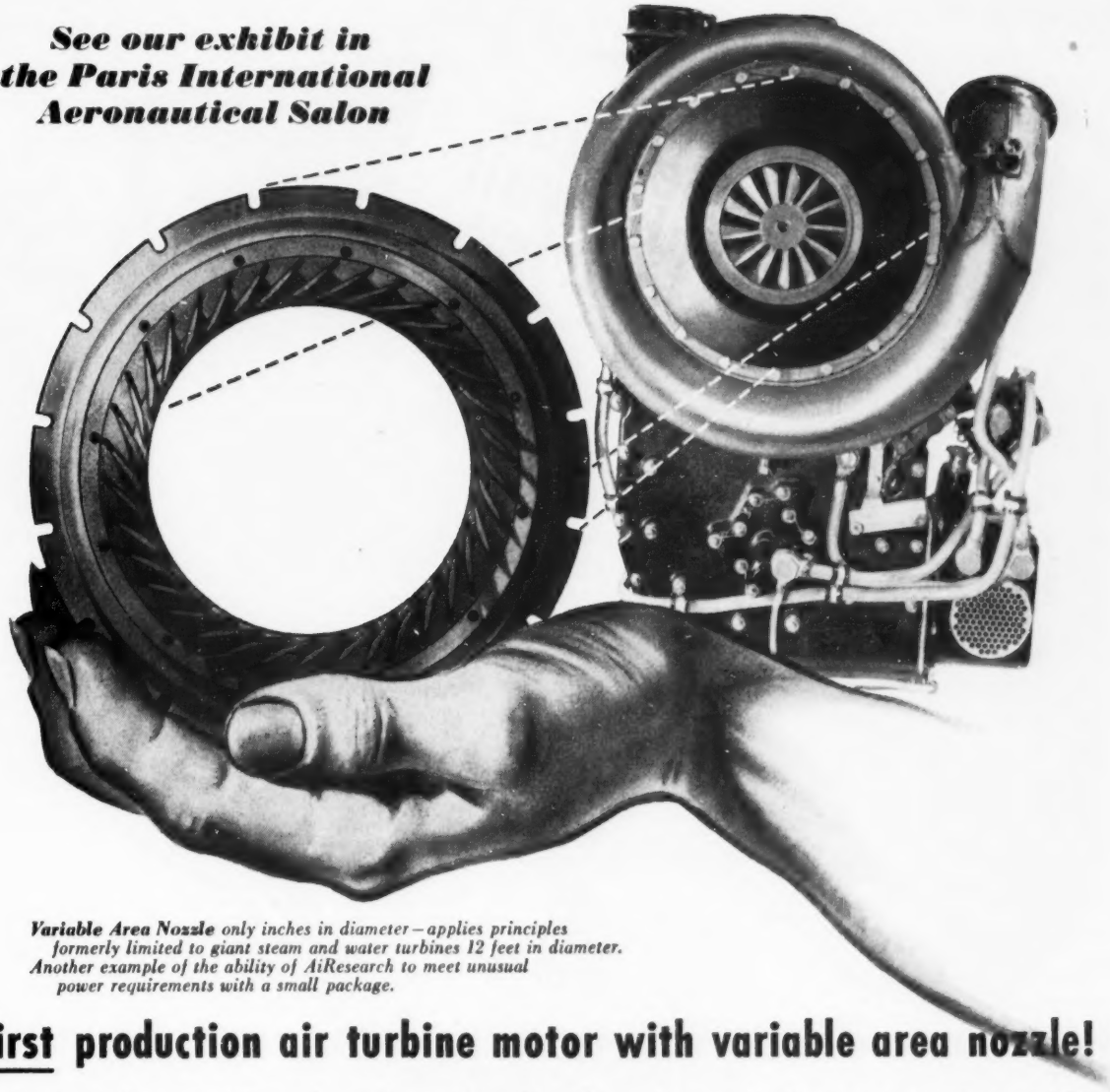
Although the use of the word "standard" is fully justified, it may be supposed that no unnecessary equipment was carried; furthermore, it appears that the normal highly-stressed and, consequently, somewhat weighty, bomb doors were replaced by lighter fairings over the bomb bay. A Venner silver-zinc battery, effecting a weight-saving of about 144 lb, was given special M. of S. clearance for the record attempt.

The two vertical white lines painted on the fuselage, incidentally, are used, in conjunction with a cine-camera mounted on the Brabazon hangar, for determining A.S.I. position error.

Having already placed on record the Bristol company's generous acknowledgment to English Electric, it seems appropriate to add their observations on the part played by the Ministry of Supply. "That the attempt on the record should have been made jointly by three parties—the Ministry of Supply, English Electric and Bristol", they remark, "and that it should have been so successful, may give food for thought to those who are inclined to belittle the efficiency of Government and industry alike in aviation matters. If the successful designs spring, as they do, from the originality of thought of the firms—an originality spurred on by continuous and healthy competition—full credit must also be given to the judgment and courage of the Ministry officials who have the responsibility of saying, at a very early stage in the life of a project, "Yes—go ahead." The Olympus, in its Canberra flying test bed, has amply vindicated their faith no less than that of Bristol."

Among firms which shared in the success, by supplying materials, components, and other services, were the following:
Accles and Pollock, Ltd.; Avica Equipment, Ltd.; Bell's Asbestos and Engineering, Ltd.; Birmingham Aluminium Castings (1903) Co., Ltd.; Thomas Bolton and Sons, Ltd.; British Insulated Callender's Cables, Ltd.; David Brown Foundries, Ltd.; Brown Bayley Steels, Ltd.; Coopers Mechanical Joints, Ltd.; Cross Manufacturing Co. (1938), Ltd.; Henry Crossley (Packings), Ltd.; Dunlop Rubber Co., Ltd.; Firth-Derihon Stampings, Ltd.; Firth-Vickers Stainless Steels, Ltd.; Sir George Godfrey and Partners, Ltd.; John Harper (Mechanite), Ltd.; High Duty Alloys, Ltd.; Hughes-Johnson Stampings, Ltd.; Wm. Jessop and Sons, Ltd.; Richard Klinger, Ltd.; Light Metal Forgings, Ltd.; Joseph Lucas (G.T.E.), Ltd.; Morgan Crucible Co., Ltd.; Plessey Co., Ltd.; Ransome and Marles Bearing Co., Ltd.; Robert Riley, Ltd.; Rotax, Ltd.; Rotol, Ltd.; Sangamo Weston, Ltd.; Serck Radiators, Ltd.; Shell Petroleum Co., Ltd.; Smith Clayton Forge, Ltd.; Smiths Aircraft Instruments, Ltd.; Sterling Metals, Ltd.; Sheepbridge Steel Castings, Ltd.; Tubes, Ltd.; Geo. Turton Platts and Co., Ltd.; Vokes, Ltd.; C. C. Wakefield and Co., Ltd.; Henry Wiggin and Co., Ltd.; Yorkshire Engineering Supplies, Ltd.

See our exhibit in the Paris International Aeronautical Salon



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You will be welcome and will find much of interest in the field of aircraft accessories at our exhibit at the Paris International Aeronautical Salon.

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CITY and SUBURBAN HELICOPTERS

New York Airways Extend Their Operations

By BASIL ARKELL, A.R.Ae.S.

The first roof-top helicopter landing platform in the New York area. It is located on the Port of New York Authority's sixteen-storey building on Eighth Avenue, and is used for the rapid transportation of officials to the three main airports controlled by the Authority.

RECENT additions to their scheduled helicopter services have been announced by New York Airways. Following shortly on the inauguration last year of the shuttle service to link New York's three main airports, La Guardia, International (Idlewild) and Newark, the new suburban route opened provides a twice-daily service between La Guardia and Bridgeport, Connecticut, with eight intermediate stops. It is fitting that the terminal destination of the first suburban route to be opened should be the home of the Sikorsky S-55 helicopters employed. No doubt a close liaison between manufacturer and operator can be maintained in this way.

Scheduled flying on the new route began in April. The early-morning machine leaves La Guardia at 0425 hr Eastern Standard Time and flies direct to Bridgeport, where it arrives at 0505. The return journey is made after a 15-min wait at Bridgeport, calling at all the intermediate stops *en route*. The schedule allows for a two-minute waiting period at each stopping point for loading and unloading, and the helicopter eventually arrives back at La Guardia at 0654.

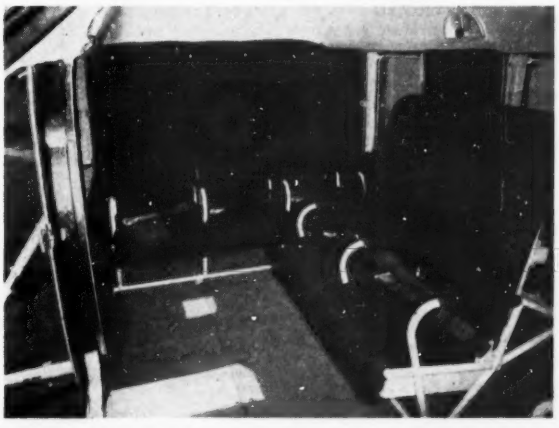
The afternoon machine leaves La Guardia at 1711 hr, making the outward journey *via* the intermediate stopping places with the same two-minute waiting time at each. Arriving at Bridgeport at 1845, it then flies back direct to La Guardia to complete the circuit at 1940.

As with the airport shuttle service, only freight carriage is undertaken at the present time on the Bridgeport route. The official air freight tariff-sheet is an illuminating document. Rates average between four and five cents per pound weight, with a minimum charge of four dollars per shipment. The general policy is to carry freight which will require no attention in transit; but provision is made, at special rates, for the carriage of a wide variety of commodities ranging from live cattle to precious metals.

Three further suburban routes are due to be opened this summer, one covering Long Island and the other two in the New Jersey area. Port Jefferson and Patchogue are the planned terminal points on Long Island, while on the New Jersey side the four towns of Middletown, Netcong, Flemington and Trenton will all eventually be served. An extension to the Trenton route will ultimately provide inter-city communication to Philadelphia, Baltimore and Washington D.C.

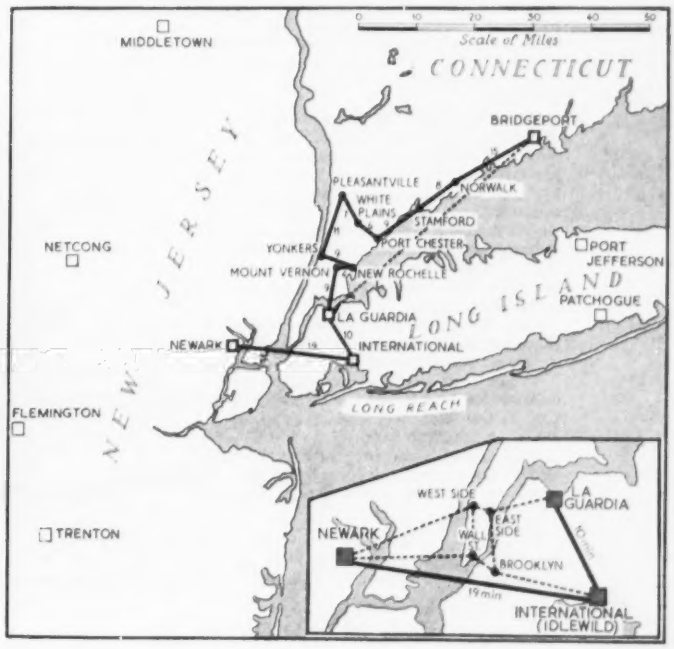
The airport shuttle service is now firmly established. The circuit, La Guardia – International – Newark – International – La Guardia, is covered 16 times daily at approximately 90-min intervals around the 24 hr. Scheduled flight time to complete the circuit is 1 hr 13 min, which includes a five-minute waiting period at each airport. Fifteen minutes are allowed for turn round and refuelling at La Guardia. The day's first schedule leaves at 0046 hr and the last helicopter completes its course by landing back at 0031—only to renew the cycle for the next day after the 15-min waiting period.

At a later stage it is intended to incorporate rotor-stations—the



Internal arrangement of the 8-passenger Sikorsky S-55. Machines currently in use are fitted as freight carriers but will be modified when C.A.B. certification allows fare-paying passengers to be carried.

The routes now being flown by New York Airways. The figures indicate time in minutes between the stage points; proposed extensions to the airport shuttle service are shown with dotted lines.



(Left) Over the Van Wyck Expressway en route for the International Airport. The cloverleaf fly-over is a fine example of modern American highway engineering. (Right) The Mid-town Manhattan skyline; it is in this area that the proposed roof-top landing sites will be erected to serve the Mid-town East-side and West-side.

CITY and SUBURBAN HELICOPTERS...

Americans seem to prefer the term "heliports"—on Manhattan Island itself. Roof-top landing sites are planned to serve the Mid-town East and Mid-town West areas. One helicopter landing site has already been installed by the Port of New York Authority on the roof of their 16-story headquarters building in downtown Manhattan. The Port Authority, who control the airports, operate their own Bell helicopters, quite distinct from the services of New York Airways. The roof-top site is in daily use for their machines, speeding personnel between headquarters and the outlying airports. Other uses to which the Authority's helicopters are put include traffic observation and photographic assignments.

In addition to its roof-top site, the heliport on the East River dock was also installed by the Port Authority and may be incorporated as a stopping place in New York Airways schedules. With the fleet of Bell machines which has been in service with the New York Police Department for a number of years on patrol and rescue work, helicopter traffic is rapidly becoming an accepted part of everyday life in this area.

New York is now the world's fourth capital city to be served by a regular helicopter service on a comparatively large scale. The others are Los Angeles, Chicago, and Brussels. The practical implementation of the earlier proposals in this respect gives considerable weight to the American expectation that "helicopter operations will reach substantial volumes in inter-city transportation by 1960."

The "64-dollar question" which is now waiting to be answered is: will British European Airways extend the scope of its present experimental helicopter freight service between London and Birmingham, and so make London the fifth capital city to enjoy such facilities on a practical scale?

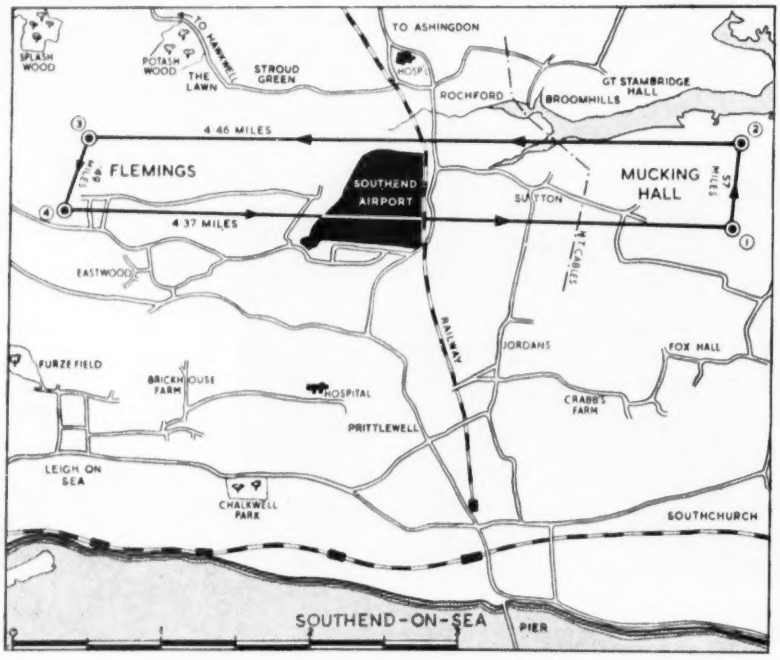
SOUTHEND SHORT CIRCUIT

MOST readers will be aware by now that the National Air Races this year (June 20th) are to differ considerably from the events organized in the past. A foretaste of what may be expected was provided late last season by the short-course closed-circuit races run at Shoreham on September 13th last year.

Reproduced here is the official map of the 1953 National circuit at Southend Airport. It has been so planned that spectators at the airfield will have the best possible view of the aircraft at all times during the race. It will be a simple matter to follow progress without reference to handicap or class. The short distance involved for the races also has the advantage of reducing competitors' costs.

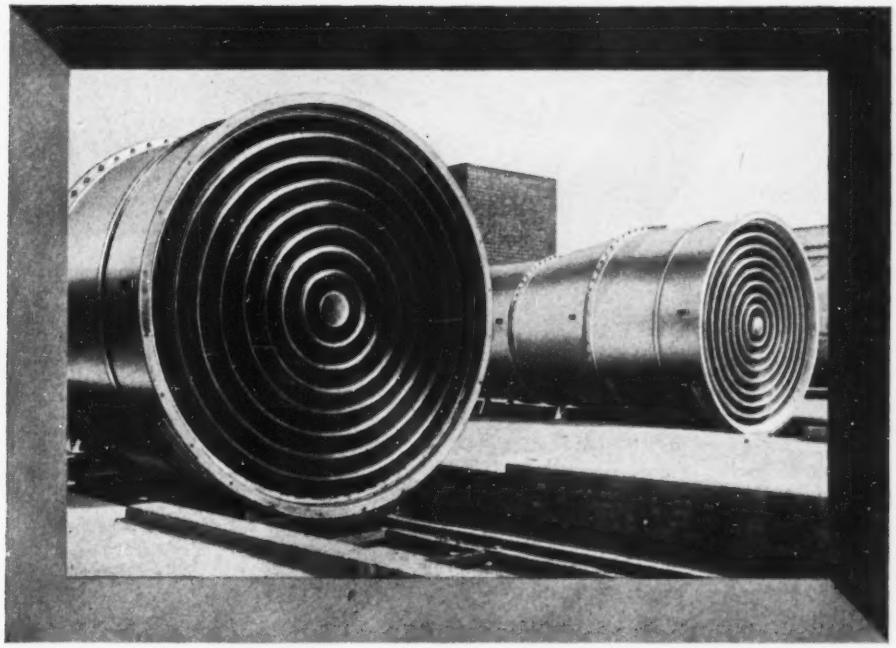
Last week the 36 entrants for the three preliminary races—run according to speed classification—were named. The first four (British) competitors in each contest will then fly for the King's Cup in the final race, which is also, of course, a handicap event.

The distances for each of the short legs of the rectangular course are indicated on the map of the airport area.



Some picturesque names appear on the course for the National Air Races.

Photograph by courtesy of the de Havilland Engine Company Limited.



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WORLD'S HEIGHT RECORD BROKEN

by Bristol Olympus-engined Canberra using

On May 4th an English Electric Canberra fitted with Bristol Olympus engines, piloted by Wing Commander Gibb, D.S.O., D.F.C., established a new World's Height Record of 63,668 feet (12 miles high)—subject to homologation.

WAKEFIELD Castrol MOTOR OIL

THE MASTERPIECE IN OILS

EXPORT MODEL: Now undergoing pre-delivery checks at Hatfield is F-BGNX, the first of three Comet Series 1As for Air France. This fleet—the last Ghost-Comets to be built—will enter service this summer on routes between Paris and the Middle East.

CIVIL AVIATION

HUNTING ORDER VISCOUNTS

AN order for Vickers Viscount 700s—the first to be placed by an independent airline—was announced on May 15th by Mr. P. L. Hunting, chairman of the group of companies bearing his name and director of Hunting Air Transport, Ltd. The announcement was made in Newcastle at a ceremony marking the inauguration of the airline's twice-daily Dakota service between Bovingdon and Woolsington Airport, Newcastle. The number of Viscounts was not officially stated, but a report that Huntings had ordered three at a cost of £900,000 is believed to be correct.

VISCOUNT CUSTOMER: Mr. P. L. Hunting.

The company's present fleet consists of eight Vikings, four Dakotas and three Yorks, which are employed on a wide variety of regular and non-scheduled services. Hunting Air Transport operate the "colonial coach" Safari service to Nairobi in conjunction with Airwork, Ltd., and, as mentioned above, have just opened a new internal service. This is the first of a number of new routes serving traffic centres in north-east England and Scotland. Tomorrow, May 23rd, services are due to begin on the Newcastle-Glasgow, Newcastle-Paris and Newcastle-Luxemburg-Basle routes and inaugural flights from Newcastle to Amsterdam, Dusseldorf, Oslo, Stockholm, Hamburg and Copenhagen should take place within the next few days. In addition, the company's aircraft are employed on trooping and casual charter. Of 59,000 passengers in 1952 two-thirds were troops.

Mr. Hunting did not specify the exact use to which the Viscounts will be put, although a company statement says that the airline looks forward to flying the aircraft in the near future (delivery will presumably be in 1955-56) on scheduled services, contract operations and ordinary charter. At present it seems likely that, in high-density form, Hunting's Viscounts may be used largely for the carriage of servicemen and their families to and from Malta and Gibraltar. The company at present holds a War Office contract for flying 30,000 people annually on these routes, on both of which the Viscount could be operated to advantage. Introduction of these modern aircraft on the colonial coach services might not be possible at first, since the low fares now offered between London and Nairobi are conditional upon the use of obsolescent aircraft, which must fly to a slower schedule than B.O.A.C.'s first- and second-class services.

LYMPNE FOR SALE

IN a written reply, Mr. Profumo, Parliamentary Secretary to the M.C.A., said last week that the Ministry had decided to offer Lympne Airport for sale. Some months ago it was offered to Folkestone Corporation who, after consultations with other local authorities, decided not to buy the airfield. Silver City Airways, who have paid over £30,000 to the M.C.A. in landing fees at Lympne, have reiterated their willingness to buy the airport at "a reasonable price."

ANOTHER NEW INTERNAL SERVICE

LAST Monday, May 18th, saw the introduction of a new week-day service between London and West Hartlepool. Operated with 32-seat Dakotas by B.K.S. Aerocharter, Ltd., the service leaves Greatham Airport at 8.30 a.m. and arrives at Northolt 1 hr 20 min later, returning from Northolt to Greatham at 6 p.m. The fares charged are £3 10s 0d single and £7 0s 0d return (identical with those charged by Hunting Air Transport on their Newcastle-London route) and the service operates from Mondays to Fridays inclusive. Passengers are "processed" through the new B.E.A. London Terminal at Waterloo.

PRINCESS IN VISCOUNT

ON Thursday, May 14th, H.R.H. Princess Margaret flew from London Airport to Oslo in a B.E.A. Viscount to attend the wedding of Princess Ragnhild. Flown by B.E.A.'s chief pilot, Captain W. Baillie, the Royal aircraft was G-AMOB, *William Baffin*, sixth of its type to be delivered to the Corporation. The return flight, with Capt. A. S. Johnson in command, was made on Sunday.

AIR-SEA TRAVEL AGREEMENT

REPRESENTATIVES of five airlines and 23 companies of the Interchange Shipping Lines met in London on May 13th and agreed to revive the pre-war system of providing interchangeable air-sea travel between Europe, Africa, the Far East and Australia. A committee was convened to formulate the agreement, details of which will be announced later. The five airlines concerned are Air France, B.E.A., Sabena, K.L.M. and Qantas.

I.A.T.A. TECHNICAL SESSIONS

PRESENT as well as future problems were discussed when the I.A.T.A. technical conference took place at Puerto Rico recently. In addition to the helicopter symposium (reported in last week's issue), there were discussions on two complex and ever-topical aspects of present civil operations: performance requirements, and air-traffic control in the terminal area. A number of the conclusions reached are summarized briefly below; as in the case of the helicopter session, the discussions will later be published by I.A.T.A. in book form.

Factors affecting performance.—The need for a new airworthiness code was stressed, with the proviso that present safety-levels should be maintained without sacrificing efficiency "for the sake of theoretical and uneconomic restrictions on performance." In particular, the Technical Committee felt that requirements should be flexible enough to permit "local treatment of local problems." Improvements in temperature, wind and humidity statistics for all international airports were felt to be essential if these factors are to be incorporated in performance codes on a realistic basis. Climb stability rather then stalling speed was favoured as a datum for the selection of unstick speed (V_2), and it was recommended that V_2 should be a function of zero climbing speed with one engine inoperative. The Committee felt that a better understanding was needed on (*a*) re-certification of aircraft after minor modifications and (*b*) certification for protection against icing, since in both cases unrealistic procedures have imposed economic penalties on operators.

On the subject of aircraft design, the following improvements were discussed:—instruments to give the pilot a better idea during take-off of distance travelled along the runway in relation to acceleration achieved; a more accurate fuel-remaining gauge; airscrews which can always be feathered at will; more accurate outside air temperature indication; higher permissible rates of descent without speed restrictions within the normal cruising range; more satisfactory icing rate indication.

Traffic in the terminal area.—The following statement was issued by the Committee at the end of the discussions:—

(1) The total capacity of an airport to handle traffic under instrument flying conditions must be related, not only to the air navigation system which serves it, but equally to the capacity of the airways which feed into it, its relationship to other airports in the same terminal area, and

CIVIL AVIATION . . .

to such ground facilities as runways, taxiways, run-up and by-pass areas and the like.

(2) It is likely that most airports will reach their maximum capacity to handle traffic when they have two non-intersecting runways, one for landings and the other for take-offs. However, if these two are to accommodate their maximum potential, they must be planned with adequate high speed exits, suitable taxiways, run-up and by-pass areas and the like; there must be adequate separation between them; and the terminal area itself must be planned to provide separate in-bound and out-bound traffic lanes and the flexible traffic patterns needed to feed the instrument landing system at its maximum capacity. Failure to consider all of these elements may either severely restrict the capacity of the airport, or prove costly when changes must be made.

(3) The establishment of another airport in a given terminal area may actually reduce the handling capacity of the area rather than expand it, unless its runways and approach patterns are properly oriented with respect to existing airports and routes.

(4) To achieve maximum capacity for an airport, air traffic control, airline operations and navigational aid specialists, as well as airport design engineers should participate in its planning. It is desirable that planning should anticipate an ultimate need, even though actual facilities may be installed to meet the immediate demand only as it develops.

A summary of the discussions notes that the Committee "also asserted that air traffic control should always be based upon ground aids which the pilot can use directly, aided by ground radar . . ." Airborne radar, as developed for cloud and collision warning, was not felt to be a practicable way of ensuring separation between aircraft.

AMERICA'S VAST CIVIL FLEET

AN indication of the important place occupied by "corporate" aircraft in American civil aviation is provided by the news that nearly 20,000 aircraft are now used for business and professional purposes in the United States. While many of these are small aircraft of the Navion and Bonanza type, this impressive fleet includes machines as large as DC-6Bs (used by the Aramco Corporation) and it is known that private owners possess more multi-engined aircraft than all the scheduled airlines combined.

Recently published statistics give the total number of active civil aircraft in the U.S. at January 1 this year as 54,039. A survey of operations at all American airports with C.A.C. control towers showed that 57 per cent of movements were by private owners or business types, 27 per cent by airliners and 16 per cent by military aircraft. The following breakdown shows the proportions of aircraft engaged in some civil duties in America :

Category	*No. of aircraft*
Air carrier—airlines and large irregulars	1,402
Agricultural—used by farmers and ranchers in dusting, spraying and seeding, etc.	12,115
Industrial—power and pipeline patrol, survey, etc.	1,687
Business—used in connection with business or profession	19,615
For hire—charter for passengers, cargo, air taxi ..	3,576
Government—federal, state, local civil government ..	1,116
Instructional—flying instruction	5,419

Comparative figures for the United Kingdom (taken from the latest issue of the A.R.B. *Register of British Civil Aircraft*) show that a total of 1,200 aircraft hold current certificates of airworthiness. Of these, 226 are operated by the State corporations or their overseas associates, and 245 by independent operators; the latter figure includes 156 aircraft of less than 10,000 lb a.u.w. Training aircraft number 242, and there are 347 business or privately owned aircraft. The total is made up by 115 machines classified under "aerial work" and "miscellaneous."

GATWICK-JERSEY services are now being operated daily by Jersey Airlines with a 15-seat de Havilland Heron—first of its type to be introduced by a British independent. The aircraft—one of two ordered—was delivered on May 1st and went into service on May 9th.

S.A.A. TO SHARE COMETS

DETAILS have now been announced by B.O.A.C. and S.A.A. of the agreement (forecast exclusively in *Flight* of January 9) under which Comets will be jointly operated by the two companies on the London-Johannesburg route from October next. In that month the frequency of Comet first-class services will be stepped up from three to four weekly, two of which will be flown by S.A.A. crews. When operating these services, Comets will be on hire to S.A.A. and will carry the insignia of that airline, but the jet airliners will continue to be integrated, from the viewpoints of maintenance and operations, with the rest of the fleet at London Airport. The frequency of S.A.A. Constellation services will remain unaltered at three per week, but these aircraft will be turned over completely to tourist operations.

It is believed that S.A.A. bookings on this route have suffered since B.O.A.C. introduced the Comet just over a year ago, since the new British aircraft offered a journey which was smoother and faster—by some 6-8 hours—for the same fare (£315 return). From October, however, a return ticket on a Constellation will be some £60 cheaper. Whatever the results of this step, neither operator should suffer unduly, since revenue from the Springbok route is shared between B.O.A.C. and S.A.A.

GROWTH OF AVIATION IN BRAZIL

BRAZIL has no fewer than 1,010 airports and landing fields, according to a recent issue of the *I.C.A.O. Bulletin*. Of these, 24 are large enough to handle four-engined aircraft of Constellation size and 426 can accommodate smaller airliners used on scheduled services. There has been a striking expansion of commercial aviation since the independent Brazilian Air Ministry was formed in 1940. The number of transport aircraft has risen from 44 to 396, of which 220 are used on scheduled services. Over the same period 2,750 commercial pilots' licences were issued, whereas only 147 had been issued by 1940. Last year Brazilian commercial aircraft flew 391,000 hours, carrying 2,422,000 passengers and some 50,000 tons of cargo.

Brigadier Nero Moura, the Brazilian Minister for Air, commenting on the importance of civil aviation in his country, writes that : "All our various state capitals are linked by regular air services, which also serve 282 towns of more than 10,000 inhabitants. In many areas of the vast interior of the country, air transport offers the sole means of communication with the main centres of population. This is true not only of passenger transport, but also increasingly so of cargo and freight. Brazil's diversity of topographic, orographic, and demographic conditions, coupled with the vastness of the country, is such that a greater extension of the rail network would offer no solution. Neither

CORONATION CHARTER: An Airwork Hermes recently flew a West African contingent—60 members of the Nigerian Regiment—from Accra to Blackbushe, in preparation for the Coronation parade. One of the party, Regimental Sgt. Maj. Ilopuraife, is shown on arrival at Blackbushe receiving refreshments from Mrs. Albrook, an Airwork hostess.

will road transport solve the problem. In many regions of Brazil it is still impossible to use land transport, and before the era of aviation only sea and river transportation was available. From an economic point of view, such regions remained like isolated islands or peninsulas."

An experienced pilot, Brigadier Moura commanded No. 1 Fighter Group of the Brazilian Air Force during the Italian campaign and was at one time the personal pilot of President Vargas. Under the auspices of his Ministry, private flying in Brazil has also received great encouragement in recent years. Over the period 1940-1952 the number of privately owned aircraft increased from 158 to 2,227, and the country has no fewer than 10,115 licensed private pilots, compared with 318 in 1940.

A correspondent in Brazil reported recently that a number of measures have been taken to reduce airline costs. Some of the main carriers have agreed to re-arrange their schedules to avoid undue overlapping of services; the effect of this agreement is expected to be a 20 per cent reduction in the number of flights made at present. In addition, Congress recently passed a law exempting the airlines from all federal taxes (with the exception of income tax) and customs duties and charges on imports of aircraft and spares, fuel and oil. Airport fees on internal services have been suspended until September 31st, 1955, and outstanding debts for such dues are cancelled. A similar concession has been made to registered flying clubs. Foreign airlines which operate to or through Brazil will enjoy freedom from customs duties and charges on fuel, oil and spares provided that their governments accord reciprocal treatment to Brazilian overseas operators.

SKYCOT is the name given by B.O.A.C. for their new cradle, which clips on to the luggage rack above the mother's seat. The prototype was recently tested in an Argonaut at London Airport, when the occupant was one-year-old Christine Howling (with a capital "H") daughter of a Corporation staff member.

BREVITIES

IN accordance with normal M.C.A. practice regarding the naming of its airports, it has been decided to alter the name of Hurn Airport to Bournemouth (Hurn) Airport with effect from June 1.

* * *

Twelve members of the M.C.A. Constabulary were presented with Police Long Service and Good Conduct Medals by Mr. A. T. Lennox-Boyd, the Minister of Civil Aviation, at a ceremony which took place recently in London.

* * *

Copenhagen has been chosen as the venue for the annual conference of the Aircraft Brokers' Association, which is to be held from June 24-26th. Sixteen countries will be represented.

* * *

In conjunction with local interests, Sabena are organizing an international angling competition off the coast of Equatorial Africa. Competitors will assemble in November at Moanda, which is described as the "Torquay or Nice of the Belgian Congo."

* * *

Piloted by Captain A. Spooner, a B.O.A.C. Stratocruiser flew from Prestwick to Montreal on May 13 in what is claimed to be the fastest time for the 3,000-mile crossing—10 hr 33 min, representing an average speed of nearly 285 m.p.h.

* * *

On Monday, May 18, B.O.A.C. opened a weekly Argonaut tourist service between London and Beirut *via* Rome. From June 1st the service will also call at Dusseldorf, leaving London at 2 p.m. G.M.T. on Tuesdays, instead of at 4 p.m.

* * *

It is reported from India that the "House of the People" has passed the bill nationalizing the country's airline industry. The bill provides for the setting up of two State corporations, one of which will operate domestic services while the other will control overseas routes.

* * *

One of U.A.T.'s three Comets completed on May 13 a 9,400-mile round trip—from Paris to Brazaville and back—in 24 hr 4 min flying time. On both the outward and return flights the Comet covered the 2,000 mile Casablanca-Abidjan stage in one hop.

* * *

The Rootes Group has announced details of a scheme by which intending visitors to this country from overseas can hire a car (chauffeur-driven, if required) by placing an advance order with their local Rootes distributor. Specially trained Rootes staff in London watch the progress of visitors' journeys, so that if an aircraft is delayed or diverted the hired car can still be waiting at the destination at the correct time.

CLUB AND GLIDING NEWS

ONE of the less publicized of the Whit-weekend events is the tea patrol organized by the Denham Flying Club for 4 p.m. next Sunday, May 24th. Normal patrol rules will apply—defenders between one and three miles from the airfield, attackers to cross the defence area between 1,000 and 3,000ft.

UNEXPECTED visitor at Fairoaks on Sunday last was an A.O.P. Auster attached to the Royal Artillery. The object of the intensive local flying performed was to give air experience to cadets of the junior term from Sandhurst.

SENIOR Service cadets from the Royal Naval College, Dartmouth, are again to fly from Roborough Airport, Plymouth, this year. They will attend for flying each Sunday of the summer term, and during the first half of the autumn term.

SUMMER gliding courses for beginners and more advanced pilots have already started at a number of clubs. Further courses to follow include those of the Bristol G.C. (weekly courses throughout the summer); Surrey G.C. at Lasham (September 7th-18th); London G.C. at Dunstable (July 6th-18th, August 10th-22nd, August 31st-September 12th); Midland G.C. at Long Mynd (June 20th-28th, July 4th-12th, August 15th-23rd, August 29th-September 6th); the Scottish Gliding Union at Balado (July 4th-11th, July 18th-25th, August 1st-10th, August 22nd-29th); the Army G.C. at Lasham (courses for regular and territorial personnel); and the Yorkshire G.C. at Sutton Bank (May 25th-June 2nd, June 27th-July 5th, September 5th-13th).

Addresses of these clubs and other details can be obtained from the British Gliding Association at Londonderry House, Park Lane, London, W. 1 (Grosvenor 1246, ext. 20).

THE Ulster Flying Club at Newtownards Airfield, near Belfast, was officially opened on May 12th by Rear-Admiral M. S. Slattery, C.B., F.R.Ae.S., chairman and managing director of Short Brothers and Harland, Ltd. At the ceremony Admiral Slattery said that his company fully appreciated the difficulties at present facing the flying clubs—he was pleased, therefore, that Shorts had been able to assist the new club. He hoped that many young members of the firm's staff would learn to fly there.

R.Ae.C. PILOT'S CERTIFICATES ISSUED—MARCH-APRIL, 1953

No.	Name	Cl	Date	No.	Name	Cl	Date
28,317	J. L. Machin	3	5.3	28,334	R. Smyth	3	13.4
28,318	G. Williamson	1	6.3	28,335	W. J. Twitchell	1	15.4
28,319	M. Donovan	4	6.3	28,336	S. D. Turner	3	15.4
28,320	M. J. Bailey	4	10.3	28,337	C. E. S. Minshaw	1	17.4
28,321	P. G. H. Mann	4	10.3	28,338	R. C. Birkett	4	17.4
28,322	D. A. Stevenson	4	17.3	28,339	B. V. Hindley	4	17.4
28,323	B. L. Jackson	1	17.3	28,340	J. D. Montgomery	3	17.4
28,324	H. F. Cox	1	18.3	28,341	L. C. T. Bendall	1	21.4
28,325	J. R. Johnston	3	20.3	28,342	P. A. White	4	21.4
28,326	R. Anderson	4	24.3	28,343	J. W. E. Berry	2	21.4
28,327	O. F. Maclaren	1	26.3	28,344	D. M. Spencer-Smith	2	21.4
28,328	B. E. Evans	4	31.3	28,345	M. de Bunsen (Miss)	2	21.4
28,329	R. E. H. Fender	1	7.4	28,346	W. Bentley	1	24.4
28,330	C. H. Stephenson	2	8.4	28,347	C. M. M. Grace	1	25.4
28,331	J. S. Eynon	1	10.4	28,348	M. P. Callaghan	4	28.4
28,332	R. W. Powe	3	11.4	28,349	L. M. Stephenson	4	28.4
28,333	H. Koppenhagen	3	13.4				

SERVICE AVIATION

Royal Air Force and Naval Aviation News

FIRST AUXILIARY STANDARD PRESENTED

ON Saturday last, at a private ceremony on the lawn at Buckingham Palace, Queen Elizabeth the Queen Mother presented a squadron Standard to No. 600 (City of London) Squadron, R.Aux.A.F. The unit, of which the Queen Mother is Honorary Air Commodore, had earned the honour by virtue of its war service and 25 years' continuous existence.

The ceremony (writes a member of *Flight's* staff who was present) was impressive, the lawns with their bluebell-clad banks, the lake, and the trees in their spring colours making a wonderful setting for such a parade. It was difficult to believe that this function was in fact taking place in the very heart of the capital. All was serene, the subdued hum of London's traffic serving only as a musical background to the song of the blackbirds.

Presently the strains of the R.A.F. Central Band could be heard and the squadron marched on to the lawn with colours cased. Shortly before the ceremony was due to begin, Air Marshal Sir Dermot A. Boyle, A.O.C-in-C. Fighter Command, and A.V-M. the Earl of Bandon, A.O.C. No. 11 Group, took their places. The Standard, still cased, was placed on the piled drums by F/S. De Vroome, with Sgts. Overton and Delaney as escorts.

The Queen Mother walked out from the Palace with G/C. Peter Townsend, G/C. J. M. Birkin, Inspector of the R.Aux.A.F., and Lord and Lady De L'Isle and Dudley as her escort; then she inspected the parade, stopping to speak to a number of the officers and men.

For the consecration and presentation, the Standard was uncased by F/Ls. Warburton and Norman and laid on the piled drums. It then became apparent that the original badge of the squadron, incorporating the arms of the City of London, has been chosen in preference to the unit's second badge, which, devised during the war, showed a quarter moon crossed by a sword, representing the squadron's night-fighting rôle. The eight battle honours selected for inclusion on the Standard are: Home Defence 1940-42, Battle of Britain 1940, France and Low Countries 1940, North Africa 1942-43, Sicily 1943, Salerno 1943, Italy 1943-45, Anzio and Nettuno.

At the completion of the consecration service, conducted by the Rev. Dr. N. E. Wallbank, G/C. Birkin handed the new Standard to Her Majesty, who then made the presentation; the bearer was F/O. S. Taylor, a National Service pilot.

In her address the Queen Mother congratulated the squadron on having won the Standard, recalling the circumstances in which, in 1943, the late King had given his approval for such an award. "I know," Her Majesty said, "it was his wish that my squadron, No. 600, should come to Buckingham Palace to receive their Standard." S/L. J. P. Meadows, the commanding officer, replied, thanking the Queen Mother on behalf of the squadron and all its past members.

The ceremony concluded with the squadron marching past in slow and quick time, followed by the advance in review order.

Queen's Birthday Fly-past

BOMBER COMMAND will be responsible for this year's R.A.F. Fly-past, in honour of the Queen's birthday, on June 11th. At 1300 hr, after the ceremony of Trooping the Colour, 36 Canberras of No. 1 Group will fly over Buckingham Palace.

The formation will be led by G/C. N. C. Hyde, Officer Commanding R.A.F. Station Binbrook, Lincolnshire, and will fly in three groups of 12 aircraft each, at 380 m.p.h.

The Royal Review at Odiham

IN the Royal Review, taking place on Wednesday, July 15th, at Odiham, Hampshire, about 1,000 aircraft will participate. At mid-day Her Majesty will inspect a parade of some 1,125 officers and other ranks and will then take luncheon with the Air Council in the officers' mess.

After lunch the Queen will inspect a parade of over 300 aircraft drawn from the Commands at Home, the 2nd A.T.A.F., Commonwealth air forces and the R.Aux.A.F. Representative members of the P.M.R.A.F.N.S., R.A.F.V.R., R.O.C., A.T.C. and C.C.F. will also be on parade, and Her Majesty's drive along the lines of aircraft and equipment is likely to take as long as one hour.

Beginning at 1540 hr, more than 600 aircraft will fly past—starting with basic trainers and then of progressively faster types up to the latest fighters. At 1615 hr the Queen will leave for London.

Air Marshal Sir Dermot A. Boyle will be responsible for the organization and control of the review, A. Cdre. G. D. Stephenson will be in charge of the parade of aircraft and G/C. R. J. A. Ford will command the morning parade. Odiham is commanded by G/C. S. C. Elworthy.

AT THE PALACE: The Queen Mother addressing the parade after presenting a standard to her squadron. (See "First Auxiliary Standard Presented" on this page.)

Percivals for the S.R.A.F.

THE Southern Rhodesian Air Force is to be re-equipped with Percival Provosts for basic training and with Pembrokes as general purpose communications aircraft. Announcing the Southern Rhodesian Government's decision the Deputy High Commissioner said: "It was most necessary for my Government to ensure, in re-equipping, that they chose the best possible aircraft."

In the Swim

CLAIMING to be "the most exclusive club in the world," the Goldfish Club (aircrew who owe their survival to dinghies) is to hold its second reunion dinner at the R.A.F. Reserves Club, 14 South Street, Park Lane, London, on Saturday, June 30th, at 6.30 p.m.

Particulars from the honorary secretary, C. G. Locke, 78, Morshead Mansions, Maida Vale, London, W.9.

Legality, Fraternity

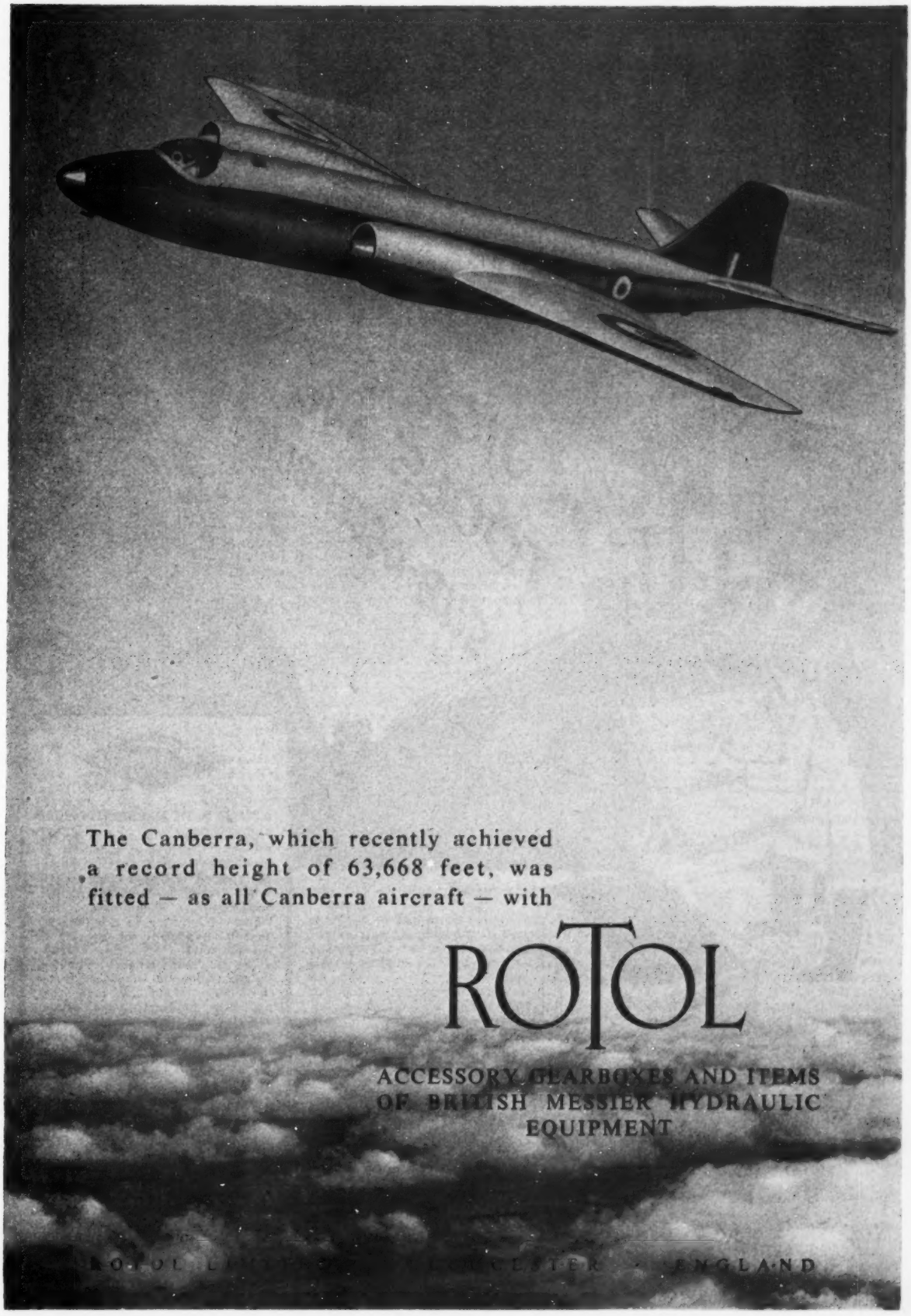
AS briefly reported last week the Lord Chief Justice of England, Lord Goddard, was the guest of honour at the third annual dinner of the R.A.F.A. legal panel held in London on Saturday, May 9th. The chairman was A.V-M. Sir Geoffrey Bromet, K.B.E., C.B., D.S.O., vice-president of the R.A.F. Association.

Proposing the toast of "The Panel," the chairman reviewed its history and activities, pointing out that some 10,000 cases had been handled through national and regional headquarters during the past seven years, excluding a large number dealt with at branch level. Replying, Councillor R. C. Politeyan, M.A. (a member of the panel) gave examples of the varied cases handled by the panel on behalf of ex-R.A.F. personnel, and thanked members of the other organizations who had helped.

Introducing his toast of "The Guests," G/C. R. C. Vaughan, O.B.E., M.C., Q.C., J.P. (chairman of the executive committee), spoke of the granting of the Association's Royal Charter. He went on to name the main guests present; they included the Lord Chief Justice, Miss E. E. Spicer, M.A., Ll.D. (representing the Law Society) and Judge Tudor Rees. A reply on behalf of the guests was made by Miss Spicer.

After being "provoked" by each speaker in turn, the Lord Chief Justice agreed to speak, and demonstrated his uncommonly good command of dialect in three revealing anecdotes. He was followed by Judge Tudor Rees, who, proving his claim to be a pioneer of flying, told of his first flight in "one of the original Avros . . . this ramshackle contraption, this juvenile delinquent of the air," and remarked on the ironical inexactitude of the subsequent description "joyride." He went on to propose the health of the Association.

The reply to this toast was made by Dame Helen Gwynne-Vaughan, G.B.E., Ll.D., D.S.C., F.L.S. (Honorary vice-president of the R.A.F.A.). There were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SERVICE AVIATION . . .

783 branches of the Association, she pointed out, including 54 overseas, and some 200 of them had their own Headquarters. Welfare was one of the Association's primary functions, and 2,000 ex-R.A.F. people—not necessarily members—had been assisted last year by members of the legal panel. The increasing interest in the Association shown by the R.A.F. authorities, she concluded, was indeed a heartening development.

R.N.Z.A.F. Combined Mess

THE new R.N.Z.A.F. Station Te Rapa, North Island, is to have a combined mess. One kitchen will serve officers, airmen and airwomen. Officers and senior non-commissioned officers are to have separate dining rooms on one side of the kitchen and airmen and airwomen will mess together in a third dining room on the opposite side of the building. All dining rooms will be equipped with tables for four.

No. 617 Squadron Anniversary

LAST Saturday, the tenth anniversary of the breaching of the Möhne and Eder dams in western Germany, representatives of Bomber Command and No. 617 Squadron, which made the attack, were guests of the headmaster, H. L. O. Flecker, C.B.E., M.A., at Christ's Hospital, Horsham, at the school's Royal Air Force Day.

Christ's Hospital has a close association with the Service through the R.A.F. Foundationers Trust, set up in 1952 with the £10,000 awarded to Dr. B. N. Wallis, C.B.E., F.R.S., in recognition of his invention of the weapon used by No. 617 Squadron against the dams, and donated by him to the schools. A further £10,000 was given by the R.A.F. Benevolent Fund. The Trust provides studentships at Christ's Hospital for the education of children of air force officers and airmen. There are already eight boys and girls in the school who are supported by it.

R.A.F. guests included Air Chief Marshal Sir Hugh P. Lloyd, K.C.B., K.B.E., M.C., D.F.C., former A.O.C-in-C. Bomber Command, G/C. J. B. Tait, D.S.O., D.F.C., Officer Commanding No. 617 Squadron in 1944 and leader of the attack which sank the "Tirpitz"—he now commands R.A.F. Station Coningsby, Lincs—and S/L. D. Roberts, D.F.C., A.F.C., the present commander of No. 617 Squadron. Dr. Wallis was also present.

Sir Hugh Lloyd inspected a Guard of Honour, mounted by the Christ's Hospital C.C.F. Air Section, after which three Canberras of No. 617 Squadron flew over in formation. The guests then looked over the school and met the boys on the R.A.F. Foundation.

The attack on the German dams—Operation "Chastise"—was made by 19 Lancasters, led by the late W/C. Guy Gibson. A new squadron, No. 617, composed of picked crews, was formed for the operation in March 1943. To perform its task, the special mine designed by Dr. Wallis had to be released from a height of precisely 60ft, at a speed of exactly 232 m.p.h. Lancasters were modified to carry the new weapon and equipped with various special instruments to assist the aircrews. An intensive training programme was begun, and rehearsals soon showed how difficult would be the task. In one trial, six out of 12 aircraft were damaged by the column of water raised when practice mines were dropped from too low an altitude.

The first Lancaster took off from R.A.F. Station Scampton, shortly before 2130 hr on May 16th. W/C. Gibson's aircraft, the first to attack the Möhne Dam, released its mine at 28 minutes past midnight. Half an hour later, just after the fifth Lancaster had attacked, Gibson radioed back to Headquarters in England the code word "Nigger," indicating that the dam had been breached.

The remaining aircraft then flew on to the Eder dam. The first mine made a small breach, and at 0152 hr, when the third aircraft had made a second break, Gibson signalled the word "Dinghy," indicating success with the second part of the operation.

Other aircraft were detailed to attack the Sorpe dam, but only two reached the target. They caused damage but no major breach.

Of the 19 Lancasters which took off for the raid, three returned without having attacked the target, for various reasons. Of the remainder, eight were shot down, some over the targets and others on the outward or homeward journeys. W/C. Gibson was awarded the Victoria Cross for his gallantry throughout the operation, and in particular for deliberately drawing the enemy anti-aircraft fire to his own aircraft while the rest of the force attacked the Möhne dam. Thirty-two decorations were awarded.

"Flight" photograph

FORMATION LEADERS of the R.A.F. Salute Fly-past over Buckingham Palace for Coronation Day: W/C. J. Wallace (Duxford), W/C. D. Crowley-Milling (Tangmere), W/C. D. C. Smallwood (Biggin Hill), W/C. J. D. Lindsey, R.C.A.F. (North Luffenham), A.V-M. the Earl of Bandon, who will control the formation, W/C. L. H. Bartlett (Wattisham), W/C. R. D. Yule (Horsham St. Faith), and W/C. P. P. C. Barthropp (Waterbeach). Details of the fly-past appeared on pages 619 and 620 last week.

Benevolent Fund Expenditure

THE expenditure of the Royal Air Force Benevolent Fund on all forms of assistance rose during 1952 to £681,474, an increase of £41,008 on the figures for the previous year. The Controller of the Fund, A.V-M. Sir John Cordingley, stated that 25,659 individual cases were helped during the year, an increase of 1,516 cases.

Speaking in London, Sir John said: "I must report that total expenditure during the year again exceeded ordinary income, including donations, subscriptions, Service contributions and bequests under wills, by £248,215. The gap between income and expenditure in 1952 was greater by £147,716 than in 1951, and the Council can only view with the greatest apprehension this continued drain upon the Fund's capital resources. Every effort must be made to increase income."

Total assistance to individual cases amounted to £653,290; housing and educational assistance accounted for the remainder of the overall relief expenditure. In England 20,282 cases received financial assistance of £562,969—an increase of more than £50,000. Scottish cases, of which there were 1,773, accounted for £27,230—an increase of nearly £4,000. In Wales 1,170 cases received £28,222; Northern Ireland and the Republic of Ireland together produced 1,807 cases, who shared £17,081—an increase of nearly £2,000. The children of more than 2,000 families were being educated at schools throughout Britain and at the Fund's own two residential schools with financial assistance from the Fund.

"Flight" photograph

ONE OF SEVEN: The Gloster Meteors of the Biggin Hill Wing ranged on the runway. They are one of the seven wings taking part in the R.A.F. Salute fly-past on June 2nd.

CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns; the names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

C.C.F. and A.T.C. Gliding Instruction

NOBODY will dispute the statement contained in the letter from Mr. J. Godley of the Southdown Gliding Club (*Flight*, April 10th), that flying on primary gliders is a poor substitute for dual instruction. He is, however, under a misapprehension in suggesting that C.C.F. cadets do not get the same opportunities as their A.T.C. counterparts.

For several years special camps have been run at A.T.C. gliding schools for cadets of the C.C.F. during the Easter and summer school holidays, and many have qualified for "B" and "C" certificates.

The curriculum at public schools prohibits weekend attendance at gliding schools, when most of the A.T.C. obtain gliding instruction. Therefore, primary gliders were introduced in C.C.F. units to stimulate interest, to provide healthy outdoor activity requiring team work and, at the same time, to provide a relief from the tedium of classroom studies which otherwise occupies such a large proportion of the syllabus in the R.A.F. Section training.

Expense rules out the provision of dual gliders and, in any case, lack of space in school grounds will normally make the operation of these aircraft hazardous.

The Air Ministry appear to have done well in providing something which is better than nothing while still offering to the C.C.F. cadets, when they have the time to take advantage of them, those facilities open to the A.T.C. as a whole.

St. Albans. C. A. PIKE.

[W/C. Pike, O.B.E., A.F.C., de Havilland Airfields Manager, is also chairman of the administrative committee of No. 220 (St. Albans) Squadron, A.T.C.—ED.]

Swords Into Ploughshares?

"The time has come", the Airstream said, "to blast at many things at odds and pods and ginger-bread, and all the drag it brings."
(With no apologies to Lewis Carroll)

YOU comment in your editorial of April 10th on the mythical misgivings of Mr. Fred Lee, acting administrator of the U.S. Civil Aeronautics Administration, regarding the design and operation of civil jet transports—with special reference to the D.H. Comet. On p. 468 of the same issue you show United Air Lines' officials gingerly handling a model airliner used to fly equally mythical jet transport operations—on paper.

But may I point out an interesting connection between the two sets of myths—both wonderful examples of cloud-cuckooland? If I am not mistaken, United's model jet project has a low-wing configuration with four underslung jet pods. The *really* mythical feature is the "un-landworthiness" of the landing gear. As an eminent American aircraft designer remarked some years ago apropos this sort of layout: "The jet pods should plough some beautiful furrows across the airport."

On second thoughts, therefore, one is inclined to appreciate the domestic misgivings of Mr. Lee. If American airline operators are calling for this sort of thing (and apparently they are—judging from recently published specifications), it might be as well to let them continue a bit longer with the paper work. Lockheed, incidentally, report that since 1945 they have turned out some 300 jet-transport design-studies! By the time Comets are flying on America's doorstep in Canada and the Caribbean, the proof of the plodding will be the absence thereof.

Los Angeles, U.S.A. D. BUNKER.

German Guided Bombs

REFERENCE to German guided bombs in *Flight* of February 13th (p. 201) was of much interest to me, because it mentioned the unit I served with during the war for three years until the end. However, I must contradict the statement regarding the German radio-controlled bombs of type Hs293 and FX and the time they were initially used in combat. Being associated with both types from 1941 onwards (at this time still in their development stage) I was in March, 1942, posted to the unit which was equipped with radio-controlled bombs. The unit was Kampfgeschwader 100 (Bomb Wing 100). The first Group of KG 100 served in Russia, the second was equipped with the Hs293 and the third group received the FX. The remote-controlled glider bomb or Hs293 was first used in combat on either August 23rd or 25th, 1943—not 1942.

I cannot give the correct dates, because I lost my log-book later on, but I remember these dates fairly well because this was the first time in war history that a guided missile was used against a pinpoint target—in this case destroyers in the Bay of Biscay, just outside of the three-mile zone of the Spanish coast (Cape Ortegal) and two days later against the remainder near Cape Finisterre.

I had no connection with our third group, KG 100; but as far as I know the FX1 was used previously to the landing of Salerno, against a British warship group near Minorca. Actually only the FX, which was a bomb with a normal vertical path, was a new weapon. The origin of the Hs293 goes back into the First World War, when the German Air Force developed it as early as 1917 as a remotely controlled glider bomb with two cables as the impulse-carrying medium. This statement will possibly rouse a certain professor to fury, because he claims something different.

Muttaburra, Australia. HARTWIG MOSLER.

No. 207 Squadron

I READ with great interest your excellent article on No. 207 Squadron, by John Yoxall. May I take up a little of your space to add some extra information concerning 207's Conversion Flight at Bottesford? I remember distinctly the first Lancaster delivered to 207 and, believe me, it caused quite a stir, mainly because of its unusual colour scheme—mostly very light shades of green and fawn.

However, can anyone enlighten me as to the following? I seem to recall that, sometime during conversion, 207 operated a certain number of "Lancs" with radial engines, and I believe the system was radials for daylight training and Rolls-Royce in-lines for night flying. Or am I confusing this with Bottesford's other Lanc unit, 467 Squadron? I was employed on H.F. D/F at the time and remember that the radials used a W/T. call-sign of USS, whilst the in-lines used PBS.

Incidentally, No. 207's trip to Friedrichshafen and then on to Blida in North Africa stands out particularly in my mind because I actually received their QAL/QNW signal when they were landing at Blida, a matter of 10 hours' flying time away from base and in most cases on a signal strength of 3 to 4, W/T.

Blackburn, Lancs. OB6, 1HD.

[Our correspondent's recollection is, clearly, of the Lancaster 2, which had Bristol Hercules VI engines. We believe he is mistaken about the day and night applications.—ED.]

More About the B.A.T.

IN reply to your correspondent, John G. Gaylard (May 8th), the gentleman in the B.A.T. Crow photograph is one R. Vaughan Fowler, but I do not know if he made any attempt to fly the aircraft.

The Crow was at one time reported to be 15ft in span, but I believe the correct figure is 19ft. The overall length was 14ft, wing area 76 sq ft, empty weight 220 lb, and a.u.w. 450 lb. The wing was in one piece and could be removed complete by detaching 16 bolts.

The machine does not appear to have had any registration letters.

Potters Bar, Middlesex. A. H. CURTIS.

Handley Page History

AS a schoolboy at Margate, Kent, during the 1914-1918 war, I paid many visits to Manston Aerodrome, and Mr. Bruce's very fine article on the O/100 and O/400 Handley Page (*Flight*, February 27th) was of great interest to me, as I remember seeing many O/100s flying above the Thanet towns during 1917. The first O/100 I saw was in the summer of 1916, I think at Manston; it was painted a cream colour and was in company with several Short landplane bombers, but these soon left the district.

Mr. Bruce mentions that "the four bombers [O/100s] were transferred to Manston on October 2nd, 1917." On October 6th, 1917, I was cycling from Minster to Margate and, passing Manston, I saw four O/100s close to the road, numbers 3116, 3118, 3139 and 3140. These may have been the numbers of the four O/100s that were designated to No. 16 squadron, R.N.A.S. One machine, 3116, was mentioned in the article; other O/100s were also stationed at Manston.

On Saturday, November 3rd, 1917, an O/100 took off at 1.50 p.m. for a local flight, but crashed in turning. The right wing-tip caught the ground and the machine turned over onto its back,

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CORRESPONDENCE . . .

catching fire almost immediately. Of the crew of five, the pilot, Flt. Sub. Lt. St. James (a Canadian), Flt. Sub. Lt. W. A. Isaacs and Prob. Fl. Off. T. R. Weston, were killed; the two other members, who jumped or fell out as the machine turned over, were seriously injured.

Another 0/100, which I saw almost daily flying about the Thanet towns during August and September 1917, was marked B-4 on the fuselage. Mention was made in the article of B-3 as having crashed; I often wonder what fate befell B-4. I saw no more 0/100s or 0/400s at Manston after November 1917. The next H.P. I saw was a V/1500 (four engines) which was stationed at Manston during October-November 1918.

Chatham, Kent. H. H. GRANT (Ex.-R.A.F.).

Helicopter Models

AS a long-established reader of *Flight* I have followed the recent correspondence on helicopter models with the greatest interest. The latest letter, which appeared on May 8th, gives the earliest date for the system under discussion as July 16th, 1952, and you will no doubt receive letters giving slightly earlier dates. However, the system, in both principle and practice, is far older than this.

A photograph in the *Picture Post* Library and dated 1926 has the following caption: "A Reversible Aeroplane: An aeroplane that can rise and land vertically has been invented by the Budapest engineer Swachuley. Amongst the interested spectators of the model was the French Military Attaché, who suggested to the inventor that an aeroplane might be constructed with a Bleriot engine."

Unfortunately, the photograph shows the model only, there being nothing else to lend scale. However, it appeared to be a conventional aeroplane of the time, with the exception of airscrews and tail. It was a monoplane, with normal undercarriage, powered by compressed air. The compressed air was led, *via* a hollow shaft, to a four-cylinder engine situated between two very large two-bladed airscrews. The engine appeared to be attached to the forward screw, whilst the crankshaft was fixed to the rear screw. The tail seemed to be of triangular (even "tripod") form, so that the aircraft could take off as a normal aeroplane with counter-rotating airscrew, or vertically as a helicopter.

This model was clearly the product of, for its day, most advanced aerodynamic thinking, and was many years before its time. Besides antedating today's model helicopters, it appears to have been the forerunner of present-day "convertiplanes," such as are often spoken of as something new or recent.

London, W.1. K. J. A. BROOKES,
Public Relations Officer,
Society of Model Aeronautical Engineers.

Story of Biggin Hill

THE history of Royal Air Force, Biggin Hill, is being written and I would be grateful if I could obtain the assistance of your readers in gathering the necessary material.

The station has a long and distinguished record and there must be many amongst those who have visited or served here who have interesting reminiscences or who possess photographs taken during their stay. I would be very pleased to hear from anyone who can help in this way. Every care will be taken of photographs or other material sent, which will be returned as soon as possible.

R.A.F. Station Biggin Hill, Kent. T. A. LYCETT, F/O.,
for Officer Commanding.

THE AERONAUTICAL BOOKSHELF

"Sailor Malan," by Oliver Walker. Cassell and Co. Ltd., 37 St. Andrews Hill, Queen Victoria Street, London, E.C.4. Illustrated. Price 10s 6d.

AMONG the greatest of the R.A.F.'s wartime fighter pilots was G/C. A. G. Malan, D.S.O. and Bar, D.F.C. and Bar, In terms of enemy aircraft destroyed he was second only to G/C. "Johnny" Johnson; but "Sailor" Malan's greatness resulted not so much from this individual achievement as from the fact that he was able to inspire younger pilots and pass on to them the benefits of his own experience.

He was older than most Battle of Britain pilots, hardened by years of rigorous maritime training, and married, with a baby son —all of which helps to explain his development into a coldly methodical, disciplined airman whose precepts for killing the enemy still make sense today. To him the war was a serious business, and his biography contains little of the long-haired, devil-may-care frivolity found in film versions of the Battle of Britain. But, apart from a few irritating minor inaccuracies it gives an interesting picture of Fighter Command's war from the viewpoint of one of the few pilots who lived right through it. We can read of Malan's unique success in a Spitfire in June 1940, when he shot down two enemy night bombers; and the references to the work of ground crews include a tribute to the civilian technicians who contributed to victory in the Battle of Britain by hurriedly providing our Spitfires and Hurricanes with v.p. airscrews.

"Flames in the Sky," by Pierre Clostermann, D.F.C. Chatto and Windus, 40 William IV Street, London, W.C.2. Illustrated. Price 12s 6d.

FEW post-war aviation books have been so widely acclaimed as this successor to Pierre Clostermann's superb, autobiographical *The Big Show*. And yet, as if mesmerised by the final, fantastic account of a suicide mission by Japanese Admirals Ugaki and Fukada, who slammed their *Baka* rocket-planes into U.S. ships off Okinawa, reviewers seem to have missed the outstanding, frightening significance of the previous chapter, entitled *Twilight of the Gods*.

The scene is set in the macabre landscape of ruin and desolation that was Langenhangen airfield, near Hanover, in April 1945. A Canadian P.R. Spitfire pilot found there nothing to justify wasting his film; yet in underground hangers there lay in wait a complex weapon that might well have crippled the British and American bomber fleets, but for a Fuhrer's "instinct."

Two miles away, in a heavily camouflaged shooting-box—headquarters of *Lehr Geschwader No.* 1—word came over the radio that 140 U.S.A.A.F. Fortresses were approaching. High Luftwaffe officers moved to the window. So did Willy Messerschmitt, designer of the Me 262 jet-fighter; Professor Fuchs, designer of the Ez 42 automatic sight with which pilots were mathematically certain to hit the target; and Fraulein Doktor Schwartz, whose tiny air-to-air R4M rocket was sufficient to pulverize a B-17.

They watched the squadron's six remaining Me 262s, led by General Gordon Gollob, Commander of the Iron Cross with Swords, Oak Leaves and Diamonds, leave the underground hangers and fly towards the Fortresses. They did not see Gollob smash into the American formations, proving the deadly perfection of the Me 262/Ez42-R4M combination; nor did they see his six-mile battle against compressibility effects as he dived away from the bombers' Mustang escort. But they did see what Gollob never had a chance to see—and two Tempests which "bounced" and killed him as he came in to land back at Langenhagen.

Reading this story, one can only be thankful for Hitler's decision to convert the Me 262 into a fighter-bomber, which delayed its introduction into service for a full year. And one can only wonder why the R.A.F. has not armed its fighters for the last seven years with R4Ms and Ez42 sights.

There are in this book eight other magnificent stories of individual heroism by Allied and enemy aircrew—intended to supplement a factual, impersonal history of the war in the air which Clostermann is now completing.

FORTHCOMING EVENTS

May 23-25. Aéro-Club d'Epernay: Champagne Rally.
May 23-24. British National Model Aircraft Rally, Waterbeach, Cambs.
May 25. S.S.A.F.A.: Display, Yeadon.
May 25. Air Display, Elmdon, Birmingham.
May 25. Women's Junior Air Corps: Display, White Waltham.
May 26. Aircraft Recognition Society (Plymouth): "Registrations and Serials," by R. S. Johns.
May 29. R.Aux.A.F.: Officers' Coronation Ball, London.
May 30. Auster Flying Club: Ragosine-Auster Homing Trophy.
May 30. Swansea and District Flying Club: Display and Race.
June 5-7. Yorkshire Aeroplane Club: International Rally.
June 6. Leicestershire Aero Club: Coronation Air Display.
June 7. Aero-Club d'Italia: Rome Grand Prix.
June 8-18. British Plastics Exhibition and Convention, Olympia, London.
June 11. R.Ae.S.: Ninth British Commonwealth and Empire Lecture, "Problems in Development of Air Transport in West Africa," by Sir Hubert Walker, C.B.E.
June 13. "At Home," R.N. Air Station, Lee-on-Solent.
June 13-14. Aero-Club d'Italia: Air Tour of Sicily.
June 13-14. Rhodes Centenary Air Display and Rally, Salisbury, Rhodesia.
June 14. Aéro-Club de Tangier: Tangiers Rally.
June 14. R.Ae.S.: Garden Party, Hatfield.
June 15. Coronation Naval Review.
June 16. I.C.A.O.: Opening of Seventh Assembly, Brighton.
June 17. Women's Engineering Society: Annual General Meeting.
June 17. Aircraft Recognition Society: Special General Meeting.
June 19. Institute of Navigation: "Accuracy of Wind Forecasts for Aviation," by C. S. Durst and D. G. Harley.
June 19-28. Zurich: British Chamber of Commerce "Made in England" Exhibition (including aviation).
June 20. "At Home": R.N. Air Station, Culdrose.
June 20-21. Aéro-Club de l'Ouest de la France: Anjou Wines Rally.

THE INDUSTRY

A Noral Directorship

FROM the Northern Aluminium Co., Ltd., comes news that Mr. B. N. H. Thornely, M.I.M.E., has been appointed to their Board. He joined the company when their Banbury works was opened in 1931, later becoming assistant works manager. In September, 1939, he was given charge of erection and management of the Rogerstone plant, where production of sorely-needed aluminium sheet and extrusions was started within a few months, with a very rapid build-up until about a quarter of the country's output of aircraft light alloy came from that works.

Mr. B. N. H. Thornely.

In 1945 Mr. Thornely organized the company's sales and sales development divisions, which had been closed down during the war, and in the following year he was responsible for the planning and construction of the continuous strip mill at Rogerstone. He was subsequently transferred to the staff of the director of operations of Aluminium, Ltd., in Montreal, Canada, and during the two years of his service he visited many of the fabricating plants of the Aluminium, Ltd., group throughout the world. At the end of last year he returned to Northern Aluminium as chief engineer, with responsibility for the co-ordination of personnel work. Mr. Thornely, who is 45, was educated at Downside School and Pembroke College.

Taking-over at Goodyear

Mr. T. B. O'Reilly

A FORTNIGHT ago we gave the news that A.Cdre. John Oliver had left the Goodyear Tyre and Rubber Co. (Gt. Britain), Ltd., in order to start activities on his own account; now comes the announcement that his successor as manager of the company's aviation sales department is Mr. T. B. O'Reilly. Already a member of the firm—he joined in 1951 as aviation sales engineer—Mr. O'Reilly has been closely connected with flying since 1937; he has held posts with K.L.M. and Swissair. Recently he visited the United States to study aircraft engineering and servicing methods.

Lightweight Fire-fighters

ILLUSTRATED on this page are two recent additions to the range of aircraft fire-fighting equipment produced by the Pyrene Co., Ltd., Great West Road, Brentford, Middlesex.

The first—already in use in a number of different parts of the world—is a self-contained foam trailer intended for airfields used by the lighter types of aircraft and which do not, therefore, demand the heavier self-propelled types of crash tender. Weighing 2¼ tons laden, it carries two (total, 200-gall.) interconnected water tanks and a 16-gallon foam-compound tank, affording a total foam output of about 1,300 gallons at a discharge-rate of approximately 600 gal/min. The mechanical foam-generator feeds twin lines of 2½ in delivery hose, and power is provided by a Coventry-Climax 120-220 gal/min pump. It may also be used as an ordinary fire pump for the delivery of water.

The second appliance is an ingeniously designed motor-cycle unit for dealing primarily with engine-starting fires. Motive-power (permitting a cruising speed of 30 m.p.h.) is provided by a 125 c.c. two-stroke Vespa lightweight motor cycle, on the sidecar chassis of which are mounted two 12 lb cylinders of carbon dioxide with high-pressure hose and a self-extending applicator for projecting the CO_2 direct into engine nacelles. A Pyrene hand extinguisher is also included in the equipment.

IN BRIEF

The London office of the Dunlop Aviation Division is now at 10-12, King Street, St. James's, S.W.1. (Whitehall 3131).

* * *

Lodge Plugs, Ltd., announce that Mr. F. M. Sayers has relinquished his post as general manager.

* * *

A brochure from F. J. Edwards, Ltd., 359-361 Euston Road, London, N.W.1, describes and illustrates their new "Besco" EBG.6 MkII eccentric punching press of 70 tons capacity.

* * *

Data on the design, cutting and operation of gears in Bakelite Laminated are given in a new booklet issued by Bakelite, Ltd., 12/18 Grosvenor Gardens, London, S.W.1.

* * *

J. A. V. Watson, O.B.E., Castrol director and general manager, has been elected to the Boards of the Wakefield associate companies W. B. Dick and Co., Ltd., and J. B. Pillin, Ltd.

* * *

There is now good news of Major H. N. Wylie, B.Sc., F.R.Ae.S., M.B.E. : he is recovering from his serious illness and is now convalescing in Scotland. Associated with Hawker Siddeley for over 30 years, he was appointed the group's patents director in 1950.

* * *

At the recent annual general meeting of the Aluminium Development Association, Mr. R. D. Hamer was elected president for the coming year. Mr. Hamer is a director of Aluminium Laboratories, Ltd., the technical management company of the Aluminium, Ltd., group.

* * *

Dealing with the many types of gearing now in use in industry and transport, a 60-page booklet with nearly 100 diagrams has been prepared by the Vacuum Oil Co., Caxton House, Tothill Street, London, W.1. Entitled *Gear Lubrication*, it is intended primarily for gear users rather than manufacturers.

* * *

A very good idea of the amount of painstaking research underlying the manufacture of high-grade steels is given by a finely illustrated booklet, of 50 large pages, devoted to the new central research and development department of the United Steel Companies, Ltd. (Westbourne Road, Sheffield 10) at Swindon Laboratories, Rotherham.

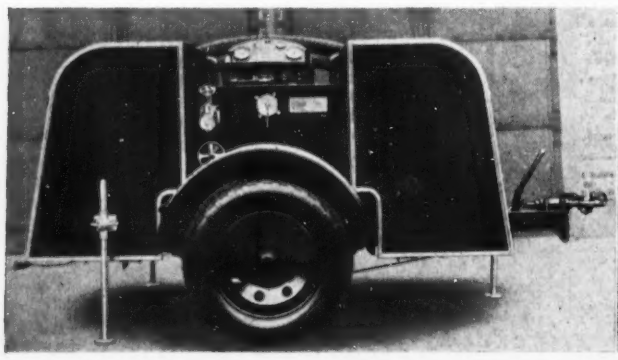
* * *

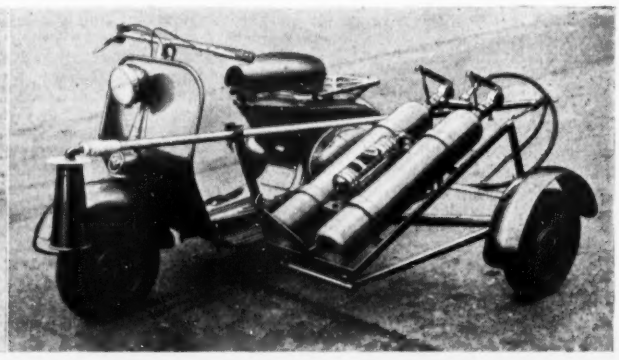
From Hellerman Electric, Ltd., Tinsley Lane, Crawley, Sussex, comes a leaflet (BH 501) illustrating the new Helvin pressure-bung for carrying cables through pressure bulkheads. As many as 150 four or six amp. Unipren cables can be carried through a bung of only 2¼ in diameter, in a 3½ in housing; the whole assembly weighs 4 oz.

* * *

New British Standards recently published include BSG 141 : 1953, for flexibly mounted instrument panels for fixed-wing aircraft, and BSG 143 : 1953, for D.C. linear and rotary actuators for aircraft. Copies are obtainable, at 1s and 2s 6d respectively, from the British Standards Institution, Sales Branch, 24 Victoria Street, London, S.W.1.

LIGHT AND HANDY : Pyrene foam trailer (left) and—designed mainly for dealing with engine-starting fires—motor cycle CO_2 unit. (See col. 1).





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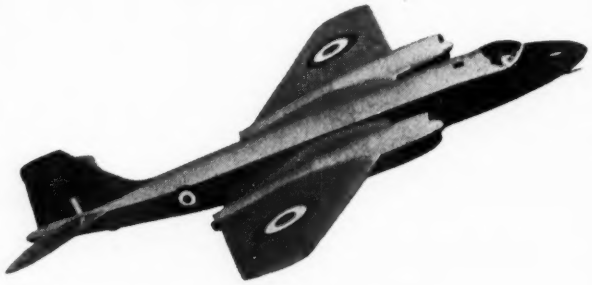

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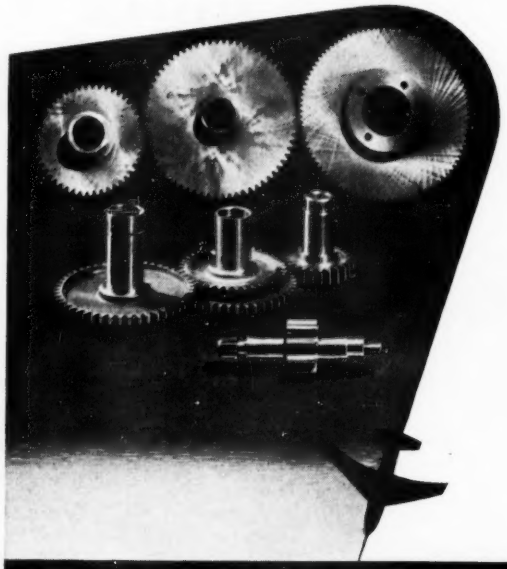

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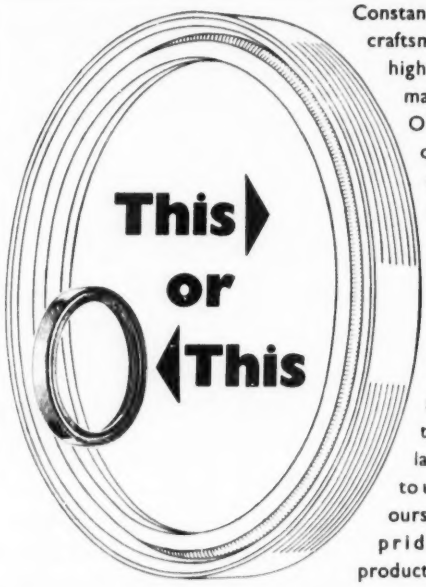

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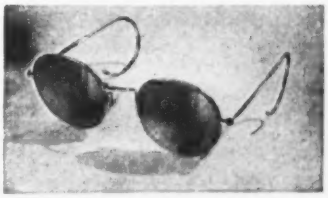

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IT is desired to secure the full commercial development in the United Kingdom of British Patent No. 620,731 which relates to "Parachutes," either by way of the grant of licences or otherwise on terms acceptable to the patentee.—Interested parties desiring copies of the patent specifications should apply to Stevens, Langner, Parry and Rollinson, 5 to 9, Quality Court, Chancery Lane, London, W.C.2. [9642

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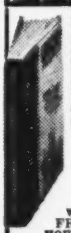

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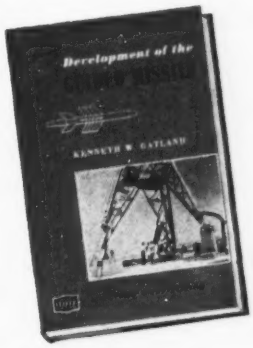

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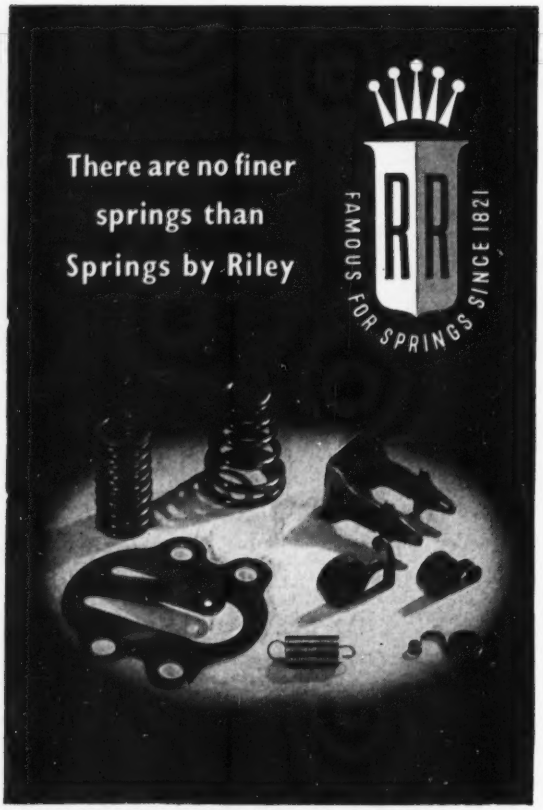

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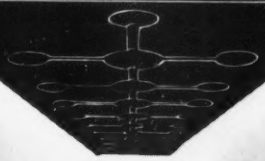

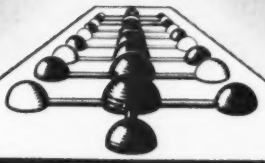

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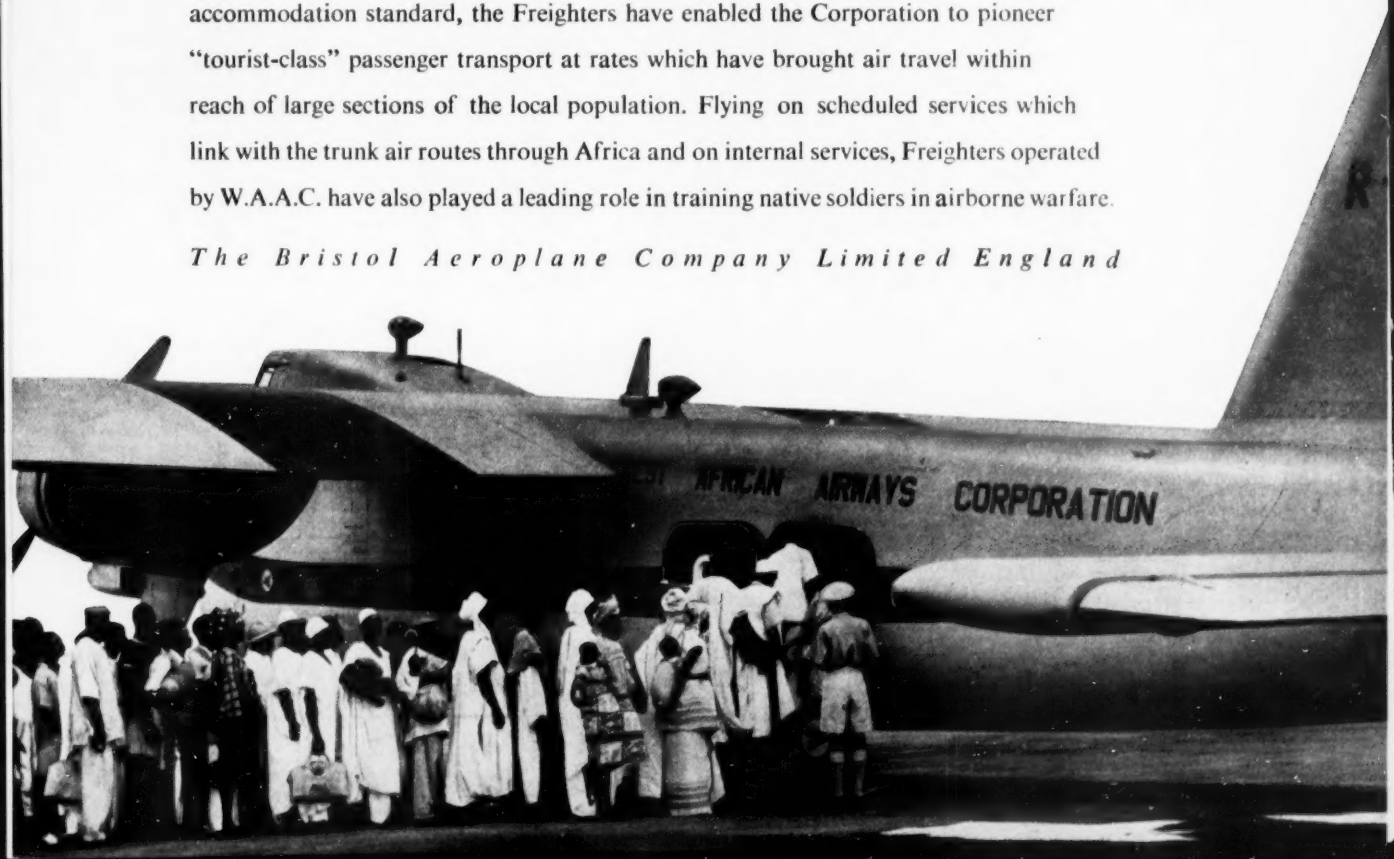
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